

COMPUTERWORLD

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Today's expert systems tools have the IS manager in mind. Page 29.

Going beyond disaster, some IS groups are being tapped to develop business recovery plans. Page 93.

The imaging gold rush has begun as vendors run to cash in on a potentially explosive market. Page 117.

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Users savor upgrade options

BY ROSEMARY HAMILTON
CW STAFF

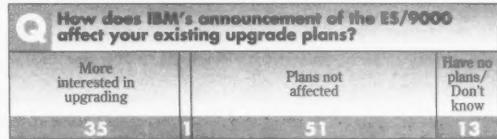
Several IBM customers who began exploring the maze of Enterprise System/9000 upgrade options last week came to the same conclusion: While it is a pain in the neck to narrow down the many choices, it sure beats being told what to do by IBM.

"We are looking at about four or five different scenarios right now," said Richard Mason, an assistant vice-president at CSX Technology, the information services group of CSX Corp. "We feel we are well-positioned to exercise any option we want."

This is a new game for 3090 users. With the ES/9000, IBM has for the first time provided upgrade paths for existing high-end mainframe users. Users can select from field upgrades, asset swaps, two-step upgrades, trans-

Making the grade

IBM's new mainframe line has piqued interest among current 3090 users



Source: Computerworld survey of 100 IBM 3090 users

CW Chart: Marie Haines

sitional systems or the straight, old-fashioned system purchase. Furthermore, current high-end [3090] customers can implement some of the new software features introduced with the System/390 generation.

While the choices can be mind-boggling, users said the ES/9000 allows them to come up with a plan that best suits their needs.

For instance, the ES/9000 Model 720, which is essentially a

Continued on page 148

Global nets rewrite delivery rules

BY ELISABETH HORWITT
CW STAFF

Data networking has become the weapon of choice for global package handlers out for a bigger piece of the international market. However, the major contenders have run up against a thicket of obstacles in their race to deploy communications lines to couriers, dispatch centers and customers in far-flung regions of the globe.

Federal Express Corp., United Parcel Services and DHL Worldwide Express are all deploying the same basic networking applications, which are designed to ensure that customers get

their packages on time or at least know the reasons for the delay. These include the following:

- Electronic links that give customs prior warning of which parcels need special attention, thus minimizing border delays.
- Wireless connections to radio frequency terminals in couriers' vans, which ensure prompt pickup of new orders and allow headquarters to track packages' progress.
- Direct links to the handler's data center that allow customers to process invoices, place new pickup orders and locate delayed parcels on their own personal computers.

The current contention for network presence

Continued on page 8

PCs repel workstation wave

BY J. A. SAVAGE
CW STAFF

As workstation prices closed in on those of personal computers during the last year, many pundits predicted that powerful workstations would replace PCs

on the desktop. However, faced with the cold reality of an entrenched PC operating system installed base and lack of commercial workstation applications, vendors are now trying to avoid the comparison.

Instead of ousting PCs, reduced instruction set computing workstation vendors, analysts and some users believe that workstations in the mid-1990s will occupy a niche of network-intensive use that is now in its infancy, with applications that cannot be handled by today's PCs.

A year ago, some analysts thought that as long as a work-

station cost the same as a PC, users would logically gravitate toward the more powerful workstation. But users contacted by Computerworld said that there was no price point at which they would simply use workstations as a PC replacement.

Elaine Bond, senior vice-president of Chase Manhattan Bank NA's Corporate Systems Group, said she might consider replacing PCs with workstations but her decision has less to do with price than with the capacity of the workstation or PC and the necessary computer power for the job.

"It won't be a PC replacement market as much as an

Continued on page 14

Giants back deal for Ingres

Ask enlists help to buy ailing database vendor

BY JEAN S. BOZMAN
CW STAFF

MOUNTAIN VIEW, Calif. — Aided by the deep pockets of two allies, Ask Computer Systems, Inc. last week said it would purchase Ingres Corp., the \$157 million relational database firm that has been sputtering along on low cash reserves in the face of stiff competition.

Ask anted up the price of \$110 million in cash through an equity relationship with both Electronic Data Systems Corp. and Hewlett-Packard Co., which, in exchange, bought a combined 30% of Ask stock.

EDS and HP, which will collectively put up \$60 million, will play a larger role than that of silent investors, Ask Chief Executive Officer Sandra Kurtzig said. "EDS and HP have a broader interest in this," she told Computerworld last week. "We're clearly going to encourage them to develop applications outside the manufacturing area" in which Ask concentrates its efforts.

Ingres users seemed a little concerned last week, even though they said they were relieved that the vendor was not going out of business.

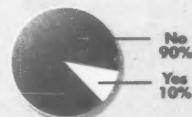
Frank Pellegrino, manager of

Continued on page 4



Strong
mainframe
need despite
downsizing

Has application offloading
decreased your company's need
for mainframes?



Response base of 108 users of 3090 200-size mainframes

See ratings, page 106

CW Chart: Marie Haines

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"Isn't it wonderful?"

PETE CLARK
OLAN MILLS

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EXECUTIVE BRIEFING

■ **IBM mainframe users are weighing a variety of options** as the dust settles from the recent ES/9000 announcement. Some large users, including Manufacturers Hanover and Blue Cross/Blue Shield of Western Pennsylvania, have already chosen IBM transitional machines while awaiting next year's Model 900s; other users are more cautious. No one is rushing to the new MVS operating system — but VM and VSE users are pleased with the new upgrade options for those systems. **Pages 1, 148 and 149.**

■ **Almost 50 IS managers have banded together** to lobby vendors for open systems. Members of the User Alliance for Open Systems intend to specify nonproprietary systems in future RFPs. The group includes General Motors, Du Pont, Eastman Kodak and Deere. **Page 4.**

■ **Workstations are not replacing PCs** in most IS shops, despite falling workstation prices. Users say price is less of an issue than displacing the entrenched DOS operating system and application base. Analysts predict that workstations will find a new niche of network-intensive processing as the decade progresses. **Page 1.**

■ **Mrs. Fields Cookies** spun off its software development group into a new company, Fields Software Group. The firm sells expert systems for retail and food operations. **Page 12.**

■ **Companies in the market for another mainframe** may need to update their evaluation processes, particularly if they are planning to use the machine as a powerful server or as part of a distributed setup. New vendor strategies and the need to preserve all options argue for a rethinking of the selection process. **Page 101.**

■ **Ingres is getting a new parent** — three, in fact. A complex agreement announced last week gave the No. 2 relational database company to Ask Computer Systems, with EDS and HP as 30% equity partners. The deal left Ingres users wondering about the new owners' different roles, while Ingres CEO Paul Newton hinted he may leave after the ownership transition. **Page 1.**

■ **Disaster recovery planning** is not enough anymore. Progressive companies are now forging "business resumption plans" that include business functions as well as data center operations — and putting the IS chief in charge of such planning. **Page 93.**

■ **Leaders in the package delivery industry** are seeking to leverage networking technology overseas the way they transformed their domestic businesses, but they are finding major obstacles. The technical and political barriers are preventing Federal Express from moving ahead of UPS and DHL, although those firms face the same hurdles. **Page 1.** DHL has called on a new man, CIO **Michael Mignogna**. **Page 67.**

Yeahandwetalk- fasttoo. If perceptions mean anything, executives both here and in the UK agree that the pace of work in the U.S. is faster than in Britain. That finding, from a series of studies by Robert Half International, Inc. that compared work habits in the two largest English-speaking countries, concluded that while Americans honor the newest and fastest ways of getting the job done, the culture of the Brits is based on respect for tradition, thoroughness and stability. The studies are intended to aid companies planning to expand into the new Europe of 1992. It is expected to take considerably longer to garner results from within the UK.



Hardware galore in listing of late-model mainframes. Page 101.



Even before it's time for a human taste test, Campbell's soups go through the expert systems taste test under the direction of Michael Mignogna. **Page 33.**

SYNCSORT. MASTERS OF INNOVATION



Announcing Support for System/390*

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Ingres

CONTINUED FROM PAGE 1

database applications at the Public Broadcasting Service, has used Ingres for two years, including its latest database version, Ingres 6.3. "It's difficult to imagine that the merger would not affect the product," said Pellegrino, who is active in the national Ingres user group. "It would be nice if they were able to keep their identity within the Ask organization. Then you'd feel like you were still dealing with Ingres. But I don't think that's going to happen. I don't see where this merger buys me a whole hell of a lot."

Intuitive feeling

"I had a feeling Ingres was going to get bought, because their stock price was getting so low, and their salesmen were expressing some concerns about the finances," said Linda Vitella, principal analyst at Syscon Corp., a Washington, D.C., government contractor. "My feeling is that if Ask takes a hands-off approach and lets the Ingres engineers do what they do best, this deal has a good chance of success."

Industry analysts were somewhat less optimistic. "If the economy were to go sour, the combined firm would have a cash-flow bind," said Paul Bloom, an analyst at investment firm Volpe, Welty and Co. in San Francisco. "But it was a smart move on Ask's part, one that I believe will prove to be financially astute in the long run."

"This merger may not fly with users because there's nothing

ing overwhelmingly synergistic about the Ingres installed base and Ask's manufacturing clients, who tend to be manufacturing engineers," said Rob Anderson, a senior vice-president at Stratagem in San Francisco. Many users contacted by *Computerworld* were not yet aware of the impending merger.

According to Ingres and Ask executives, Ingres will be absorbed by \$207 million Ask, emerging as a single entity combining Ask's manufacturing applications expertise and Ingres' relational database management systems and tools technology.

"We don't expect the Ingres name to survive the merger," said Ingres CEO Paul Newton. Newton said he was not sure if he would play a role in the combined company, adding: "I might elect to do something else, but I've made a commitment to making a successful transition."

If approved by Ask shareholders — a process that could take two months — the merged company would be a \$360 million firm with a combined work force of 2,100.

Analysts said they expect layoffs will result because of duplication of management and administrative functions. Ingres management had been faulted by both users and analysts as having done too little to position and market the Ingres database and application development tools, which many regard as technically superior to Oracle Systems Corp.'s products.

Ask and Ingres have become strong business partners in recent months, with Ask acting as an Ingres value-added reseller. But Ask executives said they felt

they alone could not field the broad array of applications that Ingres users require.

"We see the Ingres database and our own Ingres-based products as a solution for those users

within the next two weeks, said Dennis McGinn, general manager of HP's industry marketing group within HP's Advanced Manufacturing Division.

McGinn, who was central to

At a glance

Ingres had growth spurts, but Ask had staying power



Paul Newton
CEO



Sandra Kurtzig
CEO

	Revenue	Income
	(in thousands)	(in thousands)
1987	\$46,565	\$2,477
1988	\$87,386	\$7,464
1989	\$130,716	\$6,201

	Revenue	Income
	(in thousands)	(in thousands)
1987	\$98,305	\$8,001
1988	\$142,414	\$10,795
1989	\$186,293	\$13,490

CW Chart: Paul Mock

who want portable, distributed applications," said Ask CEO Les Wright. "But when you look at the overhaul of [computer] resources most corporations will have in the 1990s, it takes a company with EDS' resources to pull it off."

HP is expected to announce a deal of Ingres/Ask-related prod-

ucts within the next two weeks, said Dennis McGinn, general manager of HP's industry marketing group within HP's Advanced Manufacturing Division.

McGinn, who was central to

Leasing firm posts loss

BY NELL MARGOLIS
CW STAFF

LAKEWOOD, Colo. — Battered by both internal and industrial hardships, Capital Associates, Inc. late last week posted a \$16.8 million loss on revenue of \$151.4 million for its 1990 fiscal year ended May 31.

The red ink marked a massive slide for the computer leasing firm, which boasted profit of \$8.6 million on sales of \$138.2 million last year and appeared to be poised for growth.

"This is both a troubled Capital Associates story and a troubled leasing industry story," said Cam Philpott, an analyst at the regional company of Boettcher & Co.

Woes suffered by large Capital lessors such as Integrated Resources, the huge investment trust now in Chapter 11, left them unable to meet scheduled lease payments to Capital. A fourth-quarter, pretax \$22 million charge to cover customer defaults and written-down in-

ventory largely triggered the annual loss, Capital said.

However, more ominous than a one-time charge, Philpott said, is the fact that Capital's core businesses — including equipment remarketing, traditionally a strength for the firm — are operating at a loss.

A reorganization that ended a disruptive rule by triumvirate and established current Chief Executive Officer Richard Kazan firmly at the head of the company was a smart move but an expensive one, Philpott said.

Capital's recent move into the Japanese used and leased computer market in alliance with a subsidiary of a major Japanese bank was strategically savvy but "is eating up funds" in the short term, Philpott added.

Such particular problems, he said, are playing out against the backdrop of a third-party computer leasing market still driven by a world-wide economic and the increasingly aggressive onslaught of IBM subsidiary IBM Credit Corp.

User super group forms, pledges open systems push

BY MITCH BETTS
CW STAFF

WARREN, Mich. — Last week the Houston 30 began the Warren 45, which begat the User Alliance for Open Systems.

The coalition of 45 information systems managers created a formal structure and name for itself, agreed to join the Corporation for Open Systems (COS) and sketched some of its plans to break down barriers to open systems.

The IS managers said they could exercise their clout with vendors by specifying open systems in requests for proposals (RFPs) but that they must first persuade top management in their firms to accept the idea.

Bruce Gengler, project manager at Deere & Co., said that if all User Alliance firms could simultaneously demand open systems in their RFPs, it would demonstrate user solidarity and readiness to buy open systems.

"We need to convince management to do this," said Michael Kaminski, manager of General Motors Corp.'s Manu-

facturing Automation Protocol program.

The group's mission is to convince vendors to provide non-proprietary hardware and software products that permit interoperability and portability of applications among multivendor systems [CW, June 25]. It includes some of the biggest technology users in North America, including GM, Du Pont Co., Eastman Kodak Co. and McDonnell Douglas Corp.

The meeting produced the following list of action items:

- Maintain a list of open systems products certified by COS and X/Open Ltd.
- Publicize case histories of successful open systems projects.
- Lobby to change accounting rules that make open systems difficult to cost-justify.
- Create a process so that a consolidated list of user requirements can be communicated to the vendor community.
- Include open systems in corporate business plans.

The coalition voted to join COS so long as the User Alliance keeps its separate identity.

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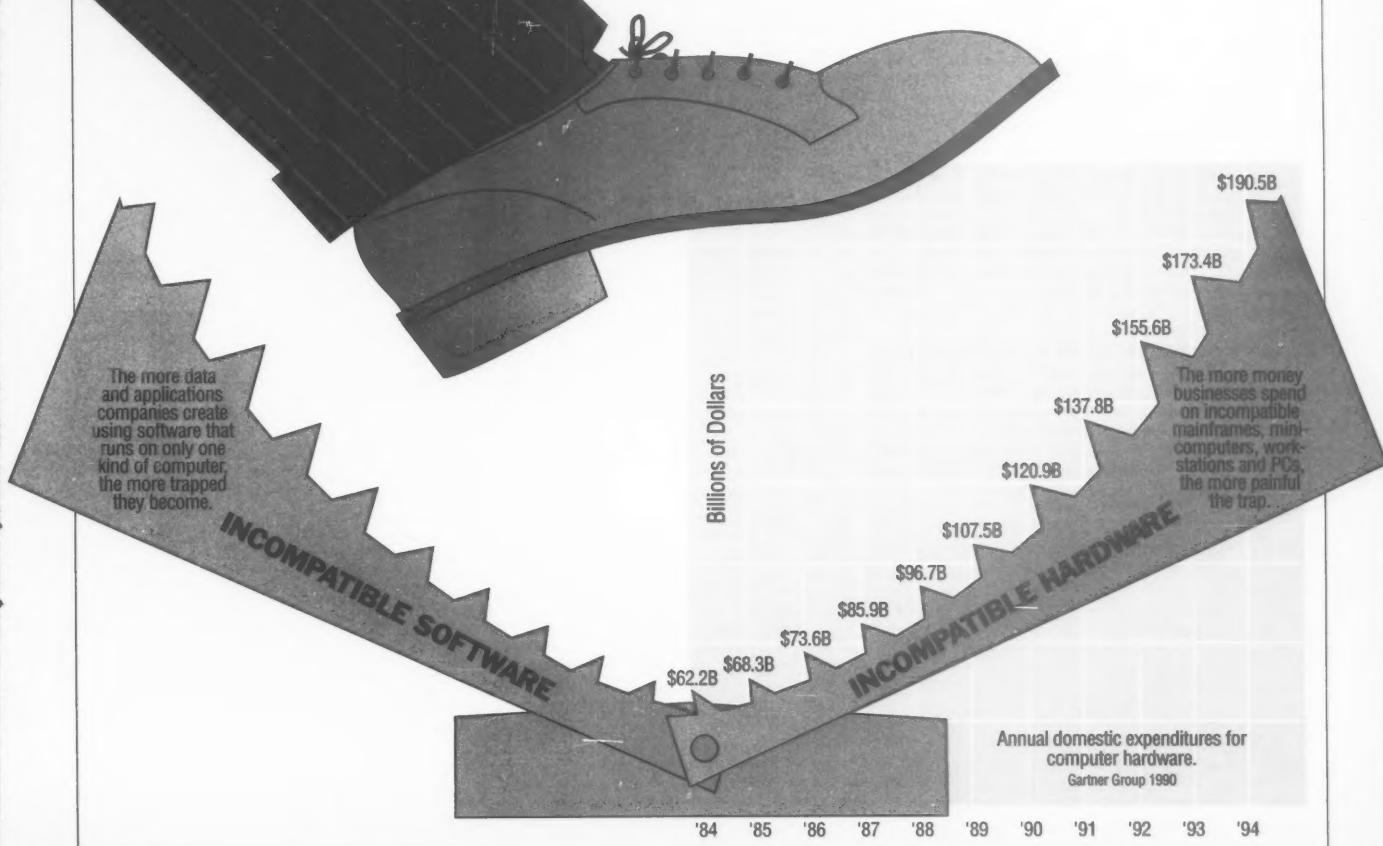
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NEWS SHORTS

Ink dries on System One deal

Electronic Data Systems Corp. (EDS) last week finalized its deal announced in February to share ownership of the System One computerized reservation system (CRS) with Continental Airlines and Eastern Airlines. EDS will pay \$250 million to become the first non-airline to own a CRS and will also take over Continental and Eastern's information systems operations for 10 years in a service contract valued at \$4 billion. The deal is subject to the approval of a bankruptcy court in New York, which has jurisdiction over Eastern.

Slow growth at Tandem

Tandem Computers, Inc., the \$1.6 billion maker of fault-tolerant computers, said last week that it may not realize its growth expectations for its fiscal year, which ends Sept. 30. "Our sales activity is at an all-time high, but our order-close rate is slower than expected," Tandem Chief Executive Officer James Treybig told a Boston meeting of industry analysts. Treybig said sales of Tandem's high-end Cyclone system, its Integrity S2 fault-tolerant Unix system and its Nonstop SQL database software were strong in some regions of the world, including Japan, Southeast Asia and Europe. However, he added, sales in the U.S., UK, Australia and Canada are slower than expected.

Sara Lee's Owens moves to Carrier

John W. Owens, a 28-year veteran of Sara Lee Corp., is the latest high-profile IS executive to change jobs. He has been named vice-president of IS at Carrier Corp., a subsidiary of United Technologies Corp. Owens, president-elect of the Society for Information Management (SIM), had been vice-president of IS and chief information officer at Sara Lee's Hosiery Division in Winston-Salem, N.C. In that position, he was a co-winner of the inaugural SIM Partners in Leadership Award in 1987 for restructuring and automating the nationwide distribution system for L'eggs hosiery. Owens said he left Sara Lee, where he had worked in several different divisions, on good terms. "I had no reason to leave; it was just a matter of wanting a new challenge," Owens said.

Aion fills out top posts

Co-founder Harry Reinstein is still the chairman at Palo Alto, Calif.-based Aion Corp. The other seats in the executive suite at the knowledge-based applications software house, however, have new occupants as of last week. Former Pansophic Systems, Inc. executive James R. Gagnard is Aion's new president and chief executive officer. Computer-aided software engineering marketing veteran Alan L. Codkind signed on as vice-president of marketing. Aion co-founder Larry Cohn ceded his presidential title to Gagnard and will man a new post: executive vice-president of technical operations.

New director named at Andersen

Chicago-based Andersen Consulting last week named Paul J. Cosgrave to the new position of managing partner, technology and integration services — Americas. Cosgrave, 40, will head the \$1 billion practice from New York and have overall leadership for the systems management and integration operation in North, Central and South America. Cosgrave has held numerous management posts within Andersen since 1982.

VAXs, supers on speaking terms

To accommodate Digital Equipment Corp. VAX minicomputer network users who need access to supercomputers, Alliant Computer Systems Corp. last week announced a software option to its Concentrix 5.0 and Concentrix 2800 2.0 Unix operating systems, which drive Alliant's FX/Series supercomputers. Alliant said that it has more than 500 supercomputer installations, about 80% of which coexist with DEC VAXes. The company's new \$15,250 DNX/LAT software reportedly uses a standard Ethernet controller and can run concurrently with Transmission Control Protocol/Internet Protocol, LAT, or Local Area Transport, is a proprietary DEC network protocol.

More news shorts on page 147

NCR to map whole new course

BY PATRICIA KEEFE
AND ELLIS BOOKER
CW STAFF

NEW YORK — In a dramatic shift, NCR Corp. is expected tomorrow to announce sweeping plans to abandon its Motorola, Inc. roots and recast itself as the office integrator of the 1990s.

According to sources who were briefed by the firm, NCR will roll out a seven-layer, three-year product plan that includes Open Systems Interconnect-based network software and a range of hardware based entirely on Intel Corp.'s microprocessor processor line.

In short, NCR has told analysts it is betting the company on Intel. The switch comes at a time when Motorola is under pressure to deliver its late next-generation 68040 chips. There have been reports that some hardware vendors have been forced to go to other chips or delay product launches. NCR could not be reached for comment.

The new NCR System 3000 line "is all CISC-based as opposed to RISC-based," said consultant Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

Users will have quite a bit to pick from under NCR's new order, which will be extended to include Intel's as-yet-unreleased 50-MHz i486 and 586 chips.

The hardware line to be announced tomorrow ranges from notebook computers at the low end to a top-of-the-line gigantic multiprocessor server called the

Model 3700. It will be designed to look like a mainframe and target on-line transaction processing and decision support. Slated for release in 1992, it will feature more than 1,000 loosely coupled processors, hardware disk arrays, AT&T's Unix System V, Version 4 and will offer up to 250,000 million instructions per second (MIPS) at full capacity. Teradata Corp. is said to be working on the project with NCR under a joint development agreement signed six months ago.

Layered below this will be the following multiprocessor servers: the Model 3600, which features 4,000 MIPS and a maximum of 256 processors; the Model 3500, which offers two to eight processors, maxing out at 320 MIPS; and the Model 3400, which offers one to four processors.

Next will come the single-processor 3300, which gives users four expansion slots and a choice of either an 80386 or an i486. Below that will be the small footprint Model 3200, which offers two expansion slots and a full 386 chip. Finally, NCR will offer a 386-based notebook and a notepad computer. Pricing was unavailable.

"This whole thing is a gigantic commitment to Intel. They feel that Intel's commitment to future releases through the year 2000 gives them plenty of room to grow and expand," Dzubeck said.

Next month, NCR will make a bold stab at making a name for itself in office integration with the

two-phased unveiling of Cooperation, described by sources as being based on Hewlett-Packard Co.'s New Wave — very IBM Officevision-like and built on C++ and object-oriented technology.

The key to Cooperation, sources said, is that unlike similar products from Digital Equipment Corp., AT&T, IBM and HP, it will be a shrink-wrapped, open system. Capable of running on any platform, it will reportedly support DOS, Windows, OS/2 and Unix System V.4.

"I would characterize it as what IBM is trying to do with Officevision," said Judith Hurwitz, editor of Patricia Seybold's "Unix in the Office" newsletter. "Users of the '90s will be looking for an integrating infrastructure, which is what this is."

The announcement overall represents a third attempt for NCR, which is one of the oldest computer companies, to reposition itself. Although analysts said they are excited by the announcement, particularly at issue are Intel's delivery schedules and NCR's ability to sell software — and sell it through nondirect channels.

And then there is the installed base. NCR is said to have detailed an elaborate migration strategy for users of its existing Motorola-based Tower product line. Dzubeck said NCR will come out with one more Motorola-based Tower, "and then that's it." Hurwitz said that since it's Unix, migrating applications from Motorola to Intel should not be a barrier.

Compaq cuts prices in bid to block clones

BY RICHARD PASTORE
CW STAFF

HOUSTON — Compaq Computer Corp. last week trimmed personal computer and memory prices an average of 20% and 25%, respectively. A reaction to competitors' stabs at its market share, Compaq's reductions are intended to help stanch the flow of customers to low-priced clone vendors, observers said.

"They're losing share to some of the quality clone companies, and they're responding to it," said Stephen Smith, an analyst at Paine Webber, Inc. in New York.

Smith said AST Research, Inc., Advanced Logic Research, Inc. and Dell Computer Corp. (see story page 122) are among the companies exacting the pounds of flesh.

The PC cuts affect most of Compaq's Intel Corp. 80386SX- and 80386DX-based line as well as its single Intel 80286-based offering. The price of the high-

end Deskpro 386/25e Model 120, for example, was cut from \$8,499 to \$6,999.

Compaq officials claimed that the move comes in preparation for the fourth quarter, which is normally their briskest.

Whatever the case, evidence shows that Compaq's pricing gambit may be coming none too soon. At the New York Transit Authority, Compaq's privileged position as one of only four approved vendors is being threatened by cost-conscious users.

"There's been a call in some of the departments for PCs that cost less," said Bob Cucinotta, chairman of the authority's PC Technical Advisory Committee. The group has been considering adding one or two so-called second-tier clone vendors to its approved vendor list. However, last week's cuts could squelch the momentum for new vendors, Cucinotta said.

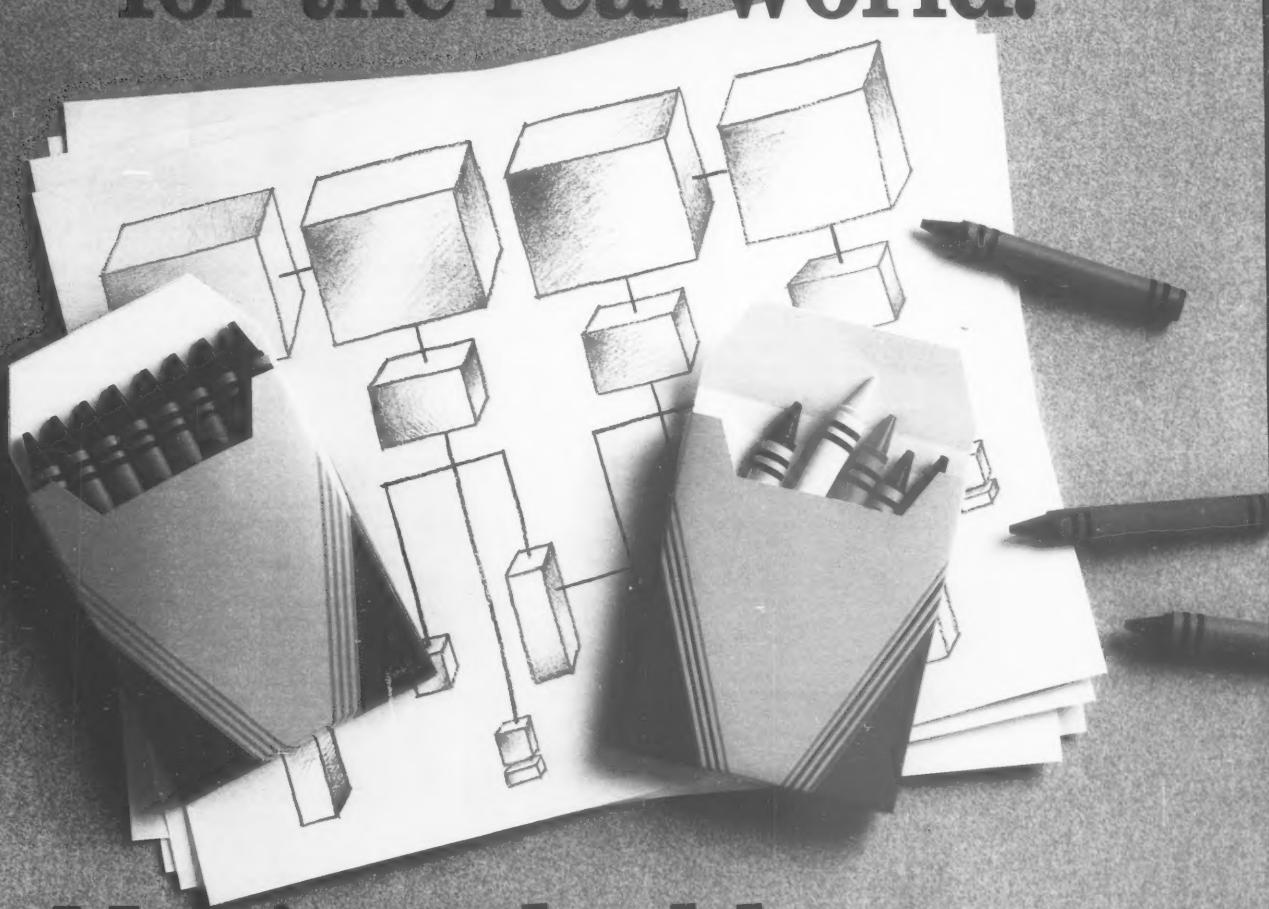
Some users said they doubted the price cuts would change their minds. Papa Gino's of

America, Inc. has some Compaq units, but it chose AST boxes for its new restaurant delivery system. "To buy one [Compaq PC] is OK, but to put them into a lot of stores would be really hard to justify," said Anthony Lewis, manager of systems analysis at the Massachusetts-based restaurant chain. "I may give them a second look, but I'm very pleased with AST," he said.

Unlike some of the second-tier firms, Compaq has a lot of cost margin to play with — some say too much margin. "Compaq is pretty far out in terms of the price umbrella," said Eric Zimits, a financial analyst at Rauscher Pierce Refsnes in Dallas.

Even Compaq Chief Executive Officer Rod Canion recently acknowledged that his company's prices were a bit out of line [CW, Aug. 27]. "We're willing to be more aggressive where it's appropriate," he said. "We're not going to cut prices where there's no competitive reason."

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Delivery

CONTINUED FROM PAGE 1

centers around Europe, Asia and the Far East, with skirmishes occurring in such remote regions as rural South America and Africa. Past advantages seem to have disappeared in the general struggle against recalcitrant foreign administrations, glutted radio frequencies and primitive analog switches.

Fedex, which pioneered the concept of a centralized tracking system in the U.S., has no clear technological advantage in Europe over UPS, "which is doing similar things now," said Bill Synott, director of the banking technology center at KPMG Peat Marwick subsidiary Nolan Norton & Co. And while DHL has only begun to play catch-up with Fedex's domestic information systems, DHL has historically taken the technological lead overseas (see story below).

Although Fedex remains a technology-driven firm from the top down, its overseas technology rollout has gone more slowly than in the U.S. Part of the rea-

son is that outside of the U.S., the carrier has had to rely heavily on "local trucking people" still using traditional radio systems, Synott said.

Indeed, Fedex has installed its Digitally Assisted Dispatch System (DADS) network in six countries so far and is adding new countries to the network at a rate of only one per quarter, a company spokesman said. The primary reason: "regulatory and infrastructure difficulties."

One "infrastructure difficulty" confronting Fedex is the scarcity of radio frequency bandwidth in Europe, said Patrick Greenish, managing director of the company's international telecommunications group. As a comparative newcomer to the overseas market several years ago, "we were obviously poor man at the plate," Greenish said. In the UK, the company wound up having to share its radio frequency channel with archrival DHL, "which raises a tremendous security issue," he added.

Fedex hopes to ease this bottleneck in 1992, when two European companies are expected to provide "skypagers," Greenish

said. These satellite-based networks "will allow you to cover continents with a single radio frequency," he added.

Not that Fedex's rivals have found it any easier to cast their lines across Europe. DHL, which started out as a global carrier in 1969 and reportedly has the biggest slice of the global market, has sophisticated links to its customers and couriers in the Far East and Australia but few such links in Europe.

In cities such as Sydney, Australia, Hong Kong and Tokyo, where populations are concentrated and labor costs high, "it makes sense to automate and make couriers as efficient as possible" by means of radio frequency tracking and electronic customer ordering systems, said Jonathan Bye, DHL's director of automation. The carrier plans to expand its systems in Europe and the U.S. during the next two years, he added.

Both UPS and Fedex have made a major push in the last few years to set up direct links between local dispatch centers and data centers that keep track of packages and customer informa-

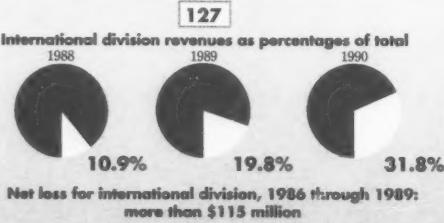
tion. However, such links are not available in all countries.

"In areas where communications are not as robust and modern as in the U.S.," UPS uses public packet-switching services, according to UPS man-

UPS has put in an application for status as a nondominant common carrier internationally so that it can "strike an arrangement with an underdeveloped country," Fields said. UPS would provide "technology and

Federal Express international

Current number of countries served



Source: Federal Express

CW Chart: Paul Mock

er of telecommunications Doug-
las Fields.

Some areas, such as rural Mexico, are inaccessible even to the packet services and require special tactics (see story page 23).

maybe capital" for network facilities, such as very small-aperture terminal satellite links, which the country would eventually take over, he added. In return, UPS would get the bandwidth it needs at wholesale rates.

Time to take control at DHL

BY ELISABETH HORWITT
CW STAFF

SAN FRANCISCO — Like a gunslinger who is brought in as sheriff to clean up the town, DHL Worldwide Express's new U.S. chief information officer has the job of rebuilding the package handler's domestic information systems operations from the ground up.

CIO Michael Lanier's task of creating a viable, aggressive U.S. operation is a crucial one, given that DHL needs to blunt archrival Federal Express Corp.'s technical edge in the U.S. if it wants to make a dent in the domestic market, according to Tony Robertson, a transportation securities analyst at Alex. Brown & Sons, Inc.

However, the job will not be a pushover by any means, according to Lanier and other sources within DHL. "The organization chart I inherited had a large number of positions that had never been filled," and there was a "brisk turnover of top-notch folks" during the past few years, Lanier said.

Behind this unsettled situation was "a confusion over direction and leadership issues," in which division management was sending mixed messages about the overall direction and priorities of the domestic IS organization, Lanier said. "Good folks can only stand hopping from one foot to another so long before they want to play in a different sandbox."

Lanier and other sources in-

side DHL refused to comment on the leadership qualities of Lanier's predecessor, William Piggott, who retired from DHL shortly before Lanier took on the job. An AT&T spokesman confirmed that prior to joining DHL, Piggott had retired from AT&T

from the ground up," Lanier said. The current chart calls for a 165-person organization, with 45 openings yet to be filled. The organization is expected to grow to 220 people, Lanier said.

Management has already shown its support by approving a



DHL's Lanier takes off on IS renovation

"He's called in markers from all over, saying, 'I need some help.' I met him for lunch, and that night I was working" at DHL, said Tony Lazzeroni, an independent consultant.

One of the long-term goals behind the restructuring is to make DHL's domestic IS operations less dependent on its international counterpart for systems and applications development service and support, Lanier said. DHL has historically concentrated its IS resources overseas, where it has risen "head and shoulders above the competition" in its IS strategic deployment, according to Jonathan Bye, DHL's director of customer automation.

Not so coincidentally, DHL is an acknowledged leader in the international package-handling market, Robertson said.

In contrast, DHL's domestic IS division has been like the younger sibling that gets the older child's hand-me-downs, while its rivals forged ahead, Bye said.

DHL needs to get its IS act together in the U.S. in order to wrest some of Fedex's 45% to 50% share of the U.S. shipping market, Robertson said. Fedex's aggressive, multimillion-dollar IS strategy has "created a standard of information excellence that's hard to beat and continues to improve it," Brown added.

Lanier hopes within the next few months to get a good handle on DHL's business priorities, and then put together "a revised architectural and technology plan" that will both support those priorities and bolster the company's competitive offensive, he said.

DHL's U.S. installation cur-

in January 1987 after working at the company for more than 30 years. Piggott was unavailable for comment.

"A large part of my business plan is to obtain credibility and firm senior management support" for what comes down to "retooling the IS infrastructure

major recruitment campaign that covers senior and middle management positions, as well as those in a wide variety of technical fields, Lanier said.

In addition, Lanier has made use of his extensive contacts in the IS field to get assistance for the early phases of his project.

rently consists of a wide range of "systems that don't talk to each other," Lanier said. Even more serious is the firm's lack of a cohesive network architecture to link its domestic and international sites and support such strategic applications as package tracking, shipment control and customer service, he added.

While refusing to speculate on what type of technology will be chosen, Lanier said that they are "certainly looking closely at relational technology and distributed technology over networks."

Lanier "definitely has a tough job" revamping both DHL's IS organization and operations, Lazzeroni said. However, his past work history makes him well-suited for the task, colleagues attested.

During his four years as senior vice-president of IS at Charles Schwab & Co., Lanier "was responsible for putting together a fast, interactive nationwide system that allowed brokers to answer customer questions quickly," Bye said. "That's the way this industry is going and where we want to go — toward a seamless portfolio of applications" that support better customer service, he added.

Lanier left Schwab shortly after the October '87 stock market crash because the San Francisco investment firm "was in a consolidation and paring-down process, and I was interested in doing more, not less," he said. In the intervening two years before joining DHL, Lanier started his own consulting firm, which "focused on business development and, where appropriate, the use of technology, for small to medium-size businesses," he said.

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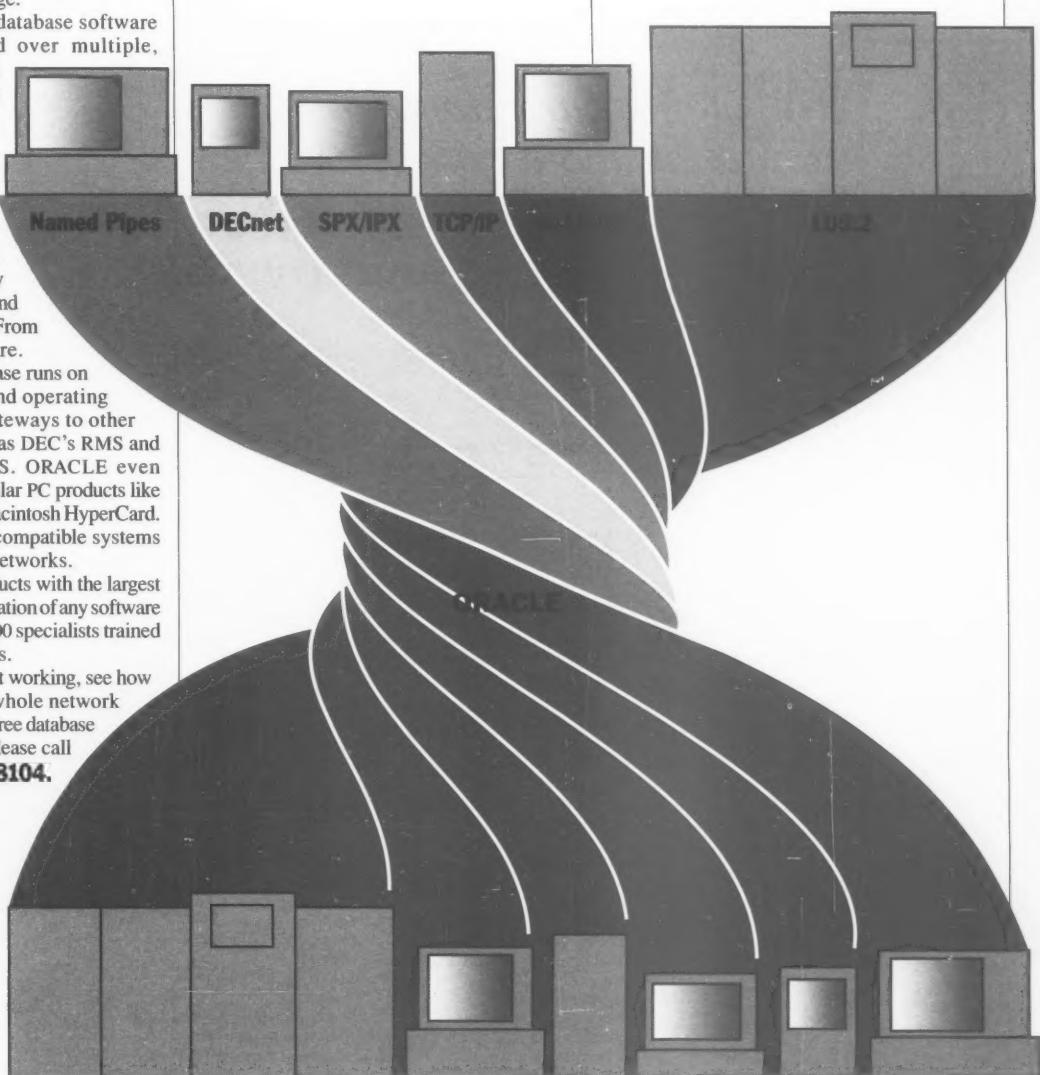
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Decnet Phase V rollout begins, minus OSI support

BY ELISABETH HORWITT
CW STAFF

DALLAS — Digital Equipment Corp. last week made good on its 3-year-old promise to begin the rollout of Decnet Phase V this month — minus the crucial VMS implementation of the Open Systems Interconnect (OSI)-based networking architecture, however.

Decnet Phase V for VMS will be available "sooner rather than later" during a "phased 18-month rollout" of Phase V, according to DEC spokeswoman Betty Eagan. DEC announced some OSI software for Ultrix, the company's version of

Unix, in Europe last week.

The introduction of native OSI support for Decnet is crucial to DEC's strategy to "supplant IBM's SNA as the backbone architecture of choice for the enterprise," said Steve Wendler, a program director at Gartner Group, Inc. who is working with DEC as a consultant on the project. However, a slippage of six to nine months is "not too bad on a three-year project," he added.

Many users were also inclined to be lenient with DEC's tardiness, given that their own OSI migration plans are still vague or long-term.

"Any OSI migration we do will be done

carefully over an extended period of time," said Stan Rose, vice-president of technical architectures at Bankers Trust Co. "I would prefer that DEC took the time to release a reliable product rather than release something early for the sake of meeting a deadline."

Eagan would give no definite reasons for the delay but said that DEC has had to incorporate a number of capabilities and features into Phase V that have emerged from discussions with customers during the past year or two. In particular, she said, users wanted a gradual migration path that would provide backward compatibility with existing Decnet Phase IV

systems and minimize user impact in terms of systems performance and reliability.

Customer feedback also convinced DEC of the need to fully integrate Transmission Control Protocol/Internet Protocol (TCP/IP) into Decnet, Eagan said.

Bankers Trust recently began eyeing TCP/IP as a way to link reduced instruction set computing-based Unix systems, vice-president Sholom Bryski said.

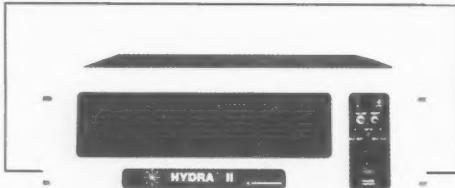
While DEC now offers OSI software for its VMS Decnet Phase IV systems, Phase V's native support will provide price and performance benefits to users, another DEC spokeswoman said. The rollout will also include routers and bridges to interconnect Decnet Phase IV, Phase V and TCP/IP systems, DEC said.

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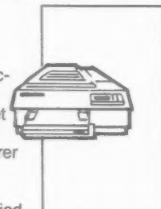
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DEC smooths SNA landing

BY ELISABETH HORWITT
CW STAFF

DALLAS — One week after IBM pushed out its Systemview strategy for centralized enterprise management, Digital Equipment Corp. told users that they could have multivendor network management their way — centered on an IBM host, on DEC's network management platform or extending across both in peer-to-peer fashion.

DEC and Systems Center, Inc. announced at Network '90 last week that they will develop products to allow the Decmcc network management platform to communicate on a peer-to-peer basis with both IBM's Netview and System Center's Net/Master offerings for managing IBM Systems Network Architecture installations.

The products, whose release date was not disclosed, will reportedly allow DEC and IBM network managers to access each other's databases and monitor and control each other's installations using their own systems' familiar commands.

Approximately 5,000 enterprises worldwide have a need for integrated network management across DEC and IBM environments, according to recent studies by Stamford, Conn.-based research firm Gartner Group, Inc.

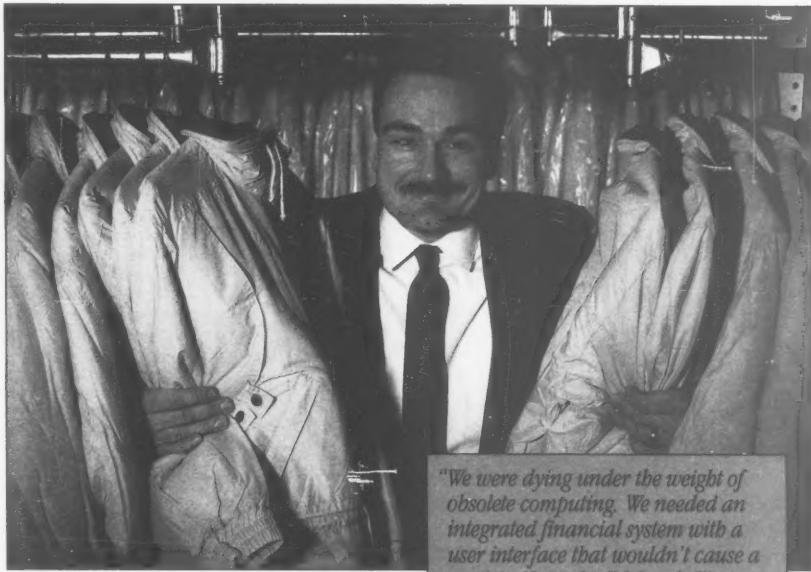
Users welcomed the vendors' flexible approach to integrated network management. At G.D. Searle & Co., for example, separate network control centers need to manage the interchange of data between the DEC and IBM sides of the house. "I think it's very important that each user group be served by the local environment, but at the same time, there is integrated troubleshooting to stop fingerpointing where links are shared," said Keith Addison, a network planner at the pharmaceutical firm. The proposed offerings would also allow IBM and DEC network control centers to take over for each other when a system fails or one center shuts down for the night, Addison added.

Greg Fahey, a manager of network planning and operations at Blue Cross/Blue Shield of Minnesota, said he likes the idea of being able to send alerts and statistical data back and forth between his company's existing Net/Master host and DEC network control center, for troubleshooting purposes.

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COMPWORLD

DEC focuses on Europe to boost lagging business

BY MARYFRAN JOHNSON
CW STAFF

CANNES, France — Antoine Ivanes arrived at the Decville '90 exhibition last week with a bit more on his mind than many of the other European executives milling about the cavernous Palais des Festivals.

Ivanes is MIS director at Somfry, a manufacturing firm in Cluses, France, which will decide next week between IBM and Digital Equipment Corp. for a complete overhaul of its computer systems.

"We want one vendor to integrate it all for us," Ivanes explained, striking upon a

major theme trumpeted at Decville. "At this point, it looks like it will be DEC."

At this European version of Decworld, DEC officials drummed on topics dear to the hearts of their continental customers, who last year accounted for 40% of the Maynard, Mass.-based firm's sales revenue. When Canada, Asia and other non-U.S. accounts are added, international business represents 56% of DEC's fortune.

"The opportunities are better here than in the U.S., based on what we can see today," said Mark Steinkrauss, a DEC finance officer.

For Somfry's \$2 million systems proj-

ect, there was no single factor swinging the pendulum in favor of a pair of DEC VAX 4000s over IBM's Application System/400 midrange machines. What pulled DEC into the lead on this bid was not only projected cost savings but integration support and anticipated ease of employee retraining, Ivanes said.

European customers tend to buy about 30% smaller systems than their U.S. colleagues and move more cautiously when it comes to new technology, said Pier Carlo Falotti, president of DEC Europe. "We must prepare to sell 50% more every year," to overcome what he called "this little moment of difficulty" in DEC's fi-

nancial history, he observed.

DEC's European customers run mainly multivendor operations and are interested in Unix-based operating systems, particularly with the 1992 market unification of Europe looming ever closer.

One marketing problem DEC confronts in Europe is the obscure reputation of Ultrix, its own version of the University of California at Berkeley Unix operating system. In one session at the conference, a Unix marketing manager asked how many in the audience realized DEC sold Unix and then despaired when no hands were raised.

Some customers are convinced that when it comes to "open systems," DEC is at least improving its reputation. "DEC really does have more to offer in open systems than IBM," said Graham Lynch, general manager of information systems for the brewery division of Guinness Worldwide Ltd. in London.

Guinness' multivendor environment includes IBM, DEC, Hewlett-Packard Co. and other vendors, but Lynch stressed that business needs, not technology, will drive the company's gradual movement toward a client/server architecture.

"The network is becoming the heart of the company," said Frans Van Hardenberg, telecommunications director at Telesystems France, a division of France Telecom. "Yet customers don't want to be dependent for their whole network on one supplier."

For users such as Shaul Dukeman, corporate vice-president of Elscint Ltd. in Haifa, Israel, it was the promise of multivendor networking that held the greatest allure at Decville. "Interconnecting computers seems to be an easier task with DEC," Dukeman said.

Software dough lures Mrs. Fields

BY MICHAEL FITZGERALD
CW STAFF

Cookie maker Mrs. Fields, Inc. is cooking up a recipe for software sales.

The Park City, Utah-based food retailer announced last week that it has spun off its software development arm into a separate company, Fields Software Group. The new company will market specialized versions of its Retail Operations Intelligence system, developed to run Mrs. Fields Cookies stores and the company's La Petite Boulangerie bakery subsidiary.

Paul Quinn, vice-president of MIS at Mrs. Fields Cookies, was named president of Fields Software Group.

Fields' products will include both IBM Personal Computer-compatible-based and Application System/400 solutions. The current product line consists of five expert systems for such tasks as labor scheduling and operation functions, electronic mail, computer-aided instruction, inventory management and other products. Target markets include fast-food vendors, specialty food vendors, specialty retail stores, restaurants and convenience stores. Quinn said that in the future, the company will produce software for supermarkets.

Quinn said Fields Software Group will announce a deal with its first big client, a major fast-food chain, probably within the next two weeks.

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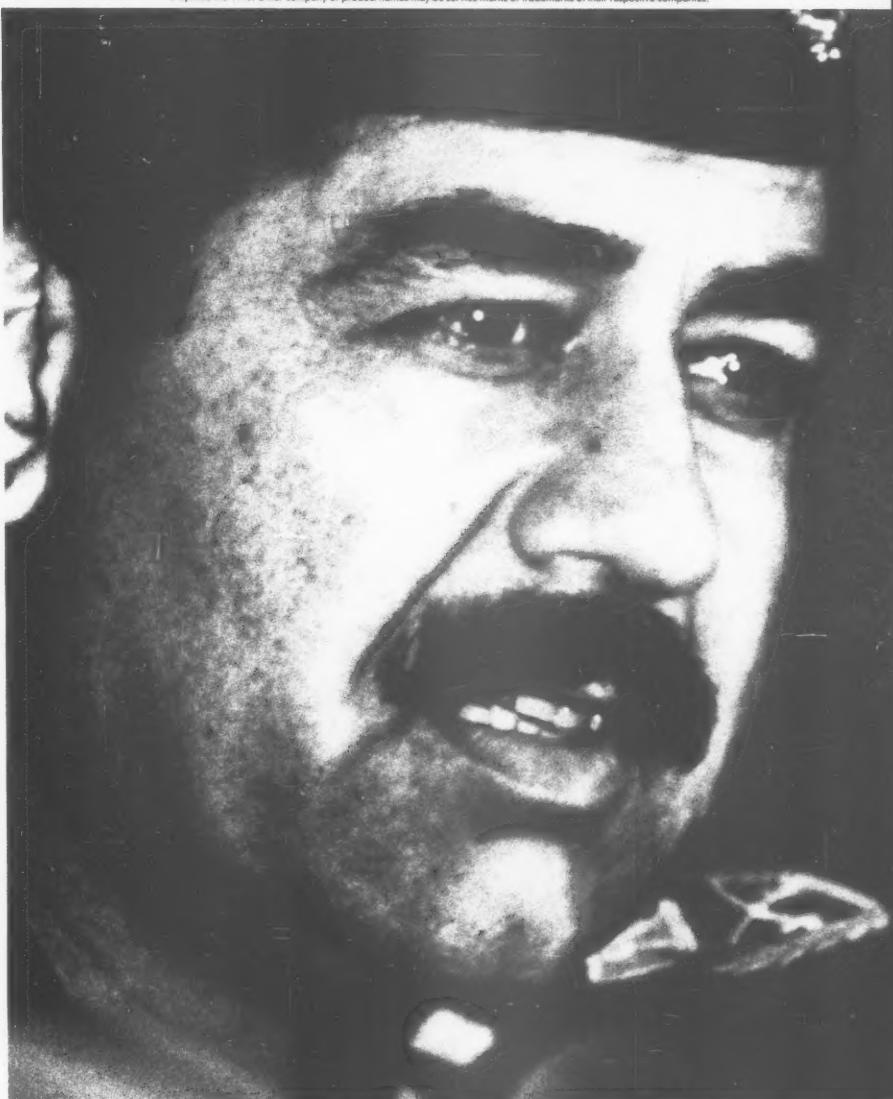
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Proteon, TI tool tackles jitter on twisted pair

BY JOANIE M. WEXLER
CW STAFF

DALLAS — Would-be 16M bit/sec. token-ring users who are jittery about the reliability of large unshielded twisted-pair networks received soothing news from Proteon, Inc. and Texas Instruments, Inc. at last week's Network '90 show.

The two companies jointly announced the Jitterbuster, a kit of components and microcode that token-ring network interface card vendors can incorporate into their products to resynchronize data signals at every node on a network. The technology addresses problems in 16M bit/sec. networks running on unshielded twisted-pair, the medium most prone to electromagnetic interference.

Jitter — signal distortion during data

transmission — can accumulate node-to-node in large networks to the point where the data can no longer be interpreted. The cumulative distortion problem in 16M bit/sec. networks was brought to the industry's attention in June, when token-ring vendor Madge Networks Ltd. publicly recalled its 4M/16M bit/sec. adapter cards because of jitter problems discovered in large configurations.

The jitter issue was unanticipated because it had not surfaced in 4M bit/sec. token-rings.

User benefits of Jitterbuster are dependent on token-ring adapter card vendors incorporating the technology into their products. Pulse Technology, Inc., Thomas-Conrad Corp. and Apple Computer, Inc. are currently among the vendors evaluating the technology for their

boards, according to Proteon.

At least one user sees an imminent use for jitter protection at his company, which is wired predominantly with unshielded twisted-pair. Rich Coulson, securities network associate at Principal Financial Group in Des Moines, Iowa, is running 4M bit/sec. token-rings using Madge adapter cards. He said he will soon need to upgrade to 16M bit/sec. because the company plans to implement bandwidth-hungry image processing applications.

Colin Mick, executive director of the Open Token Foundation, added, "Jitterbuster poses a good interim and possibly final solution" for extending networks reliably beyond TI's recommendations of what its Falcon analog chip — cited by Madge as the culprit in its boards' jitter problem — alone can support.

PCs

FROM PAGE 1

expanding market for complex applications, such as global trading," said George Weiss, an analyst at Gartner Group, Inc. in Stamford, Conn.

Even the most gung-ho RISC workstation marketing organizations are not proclaiming that workstations will replace PCs. "People almost want us to get into the PC market, but that's not what we want to do," said Edward Zander, vice-president of corporate marketing at Sun Microsystems, Inc.

Sun's alternatives

Instead of competing with PCs, Sun is looking to go against servers based on Intel Corp.'s complex instruction set computing (CISC) 80386 or 80486 CPUs and, in the process, sell workstations as nodes on a network.

Mips Computer Systems, Inc. basically agreed with Sun. Mips will sell its systems, such as servers, complementary to PCs, according to John Hime, vice-president of the Systems Product Group.

However, Mips has a two-pronged strategy. The company is also attempting to get PC vendors to use its architecture in their products, according to Mips President Chuck Boesenberg. He would not say which PC vendors are currently in discussion with Mips.

Silicon Graphics, Inc. also has plans to get into the low-price range but is still planning on developing a new niche in low-end graphics-intensive computing, rather than displacing PCs. "I don't see why someone who is using a spreadsheet needs to run it on graphics-based hardware," said Alan Trimble, chief developers advocate at the company.

The MS-DOS operating system is adequate for most users' needs, a fact that presents a formidable barrier to change. With the addition of Microsoft Corp.'s Windows 3.0, users see a new lease on life for the PC. "It will be a hard pull from DOS, especially with Windows," Weiss said.

Unix, the most common workstation operating system, has fewer commercial

applications but is more robust than DOS. Michael Goude, an analyst at Open Systems Advisor in Boston, said, for instance, that Unix is better suited for multitasking when users move toward that need.

Vendors are working hard, with some success, to get more applications running on Unix. Commercial applications — such as the ubiquitous Lotus Development Corp.'s 1-2-3 spreadsheet, which is newly ported to Sun's workstations — are increasingly springing up on Unix.

Yet simply porting applications to Unix is not enough to get users to change. Dorothy Deran, director of research information systems at Syntex Research in Palo Alto, Calif., said that running spreadsheets and word processing packages on workstations is a waste of power, and simply running PC programs adds no value.

Deran said it mattered little whether she could find the DOS applications she

teller needs, then that is what will be produced. If a \$2,000 workstation is needed by a branch manager, the bank will get a workstation. "We will tailor computer power and storage to the job," she said.

Workstation apathy

With Intel's 80486 CPU beginning to hit the PC market, users see a migration path for their current computers, further eroding any urgency felt by users to move to workstations.

"If I could buy a workstation for the price of a 486, I'd still buy the 486," said one user who saw the 486 as a migration path to more power without the pain of porting applications.

The 15 million instruction per second (MIPS) 486 may be plenty powerful for most users in the short term.

But analyst John Dean at Montgomery Securities in San Francisco said that as the gap between the power of CISC processors, such as Intel's, and RISC processors widens, users will not be so complacent. "Soon there will be a 40 MIPS chip [the Mips R4000] to compete with the 486," he said.

Vendors are betting that future network-dependent applications will be the new commercial niche for workstations — what Zander calls industrial-strength networking. Those applications — pulling up databases, windowing and communications all at once — are still in their infancy.

That is just what David Wood, vice-president of information systems at Medlantic Healthcare Group in Washington, D.C., will consider next year. "No vendor told us this, but we thought we could save some money by using workstations on a major server for new applications to support a cancer center," he said.

Multimedia may be the blockbuster application that broadens the workstation market, according to several sources. The entire workstation market stands at about \$6 billion, according to Weiss, and he said he expects it to grow about 30% per year until 1995 — about the time multimedia is expected to hit.

"When the business world gets to the point where secretaries produce videos for the boss instead of overheads, then they'll need workstations," Trimble said.

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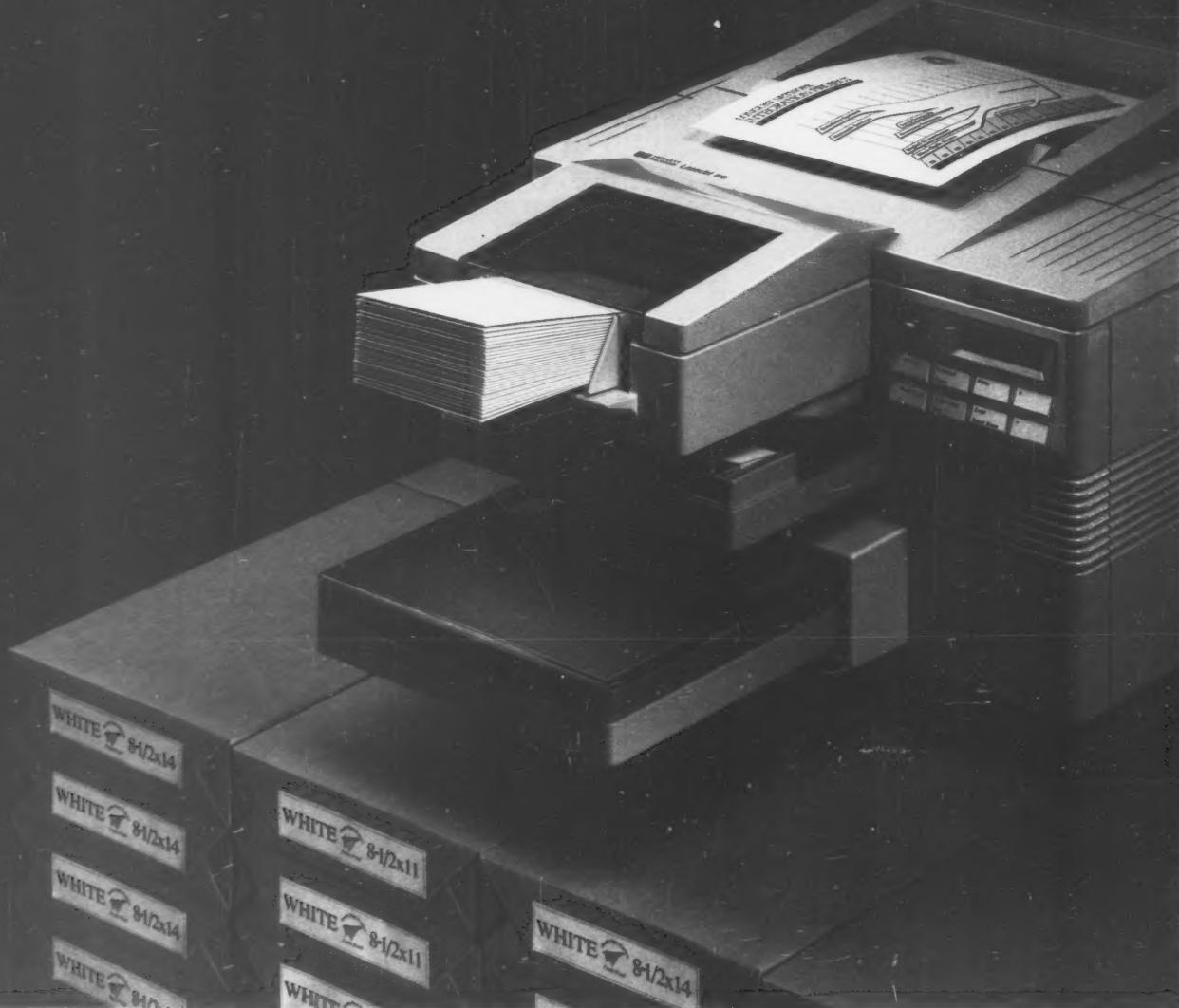
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 **HEWLETT
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Ashton-Tate to make run at Mac market with Dbase IV

BY JAMES DALY
CW STAFF

ANAHEIM, Calif. — Ashton-Tate Corp. — still reeling after a defective version of its flagship Dbase IV database scared off both users and profit — hopes to spring back with a direct assault on the lucrative Apple Computer, Inc. market this fall, Ashton-Tate officials confirmed at the firm's technical conference last week.

Leading Ashton-Tate's offensive will

be Dbase IV Runtime Plus for the Macintosh, which is expected by the end of the year. The application will offer cross-platform connectivity between Macintosh, MS-DOS, Unix and Digital Equipment Corp. VAX and VMS systems and will allow developers to take full advantage of the Dbase IV applications programming language, company spokesmen said.

If Ashton-Tate is successful, analysts said, the move could also have a big payoff for Apple, which has pushed to get

the Macintosh into the business and federal sectors but lacks a muscular third-party database offering akin to Ashton-Tate's once-dominant Dbase line.

Ashton-Tate officials said the Macintosh database market is a fertile one because it is still relatively fragmented and without a clear leader. "There is no entrenched database product in the Macintosh market right now," said Dave Proctor, general manager of the Database Division. "We intend to put one there."

Although firms such as Claris Corp., Fox Software, Inc., Acius, Inc. and Odesta Corp. provide Macintosh database offerings, "there has never been one blockbuster product, so the Macintosh has never gained a reputation as a database product," said Joan-Carol Brigham, an an-

alyst at International Data Corp. in Framingham, Mass.

Ashton-Tate first waded into Macintosh waters in 1987, but it stumbled badly. Dbase Macintosh was skewered by developers because it was not Dbase language-compatible. The application was sold in August, however, to Miami-based New Era Software Group, Inc., wiping the slate clean for Ashton-Tate's new Apple offering.

President Bill Lyons acknowledged that the firm is trying to regain its balance on what has turned out to be a very slippery surface. "The database market has remained essentially stagnant for the past two years," he said. Lyons attributed the general database market malaise to Ashton-Tate's problems with Dbase IV Version 1.0, which he said caused many users to defer their database buying plans.

Version 1.0 was a failure of spectacular proportions. A replacement application, Version 1.1, was released in late July.

In the interim, Ashton-Tate's share of the market took a nosedive. Figures from Audits and Surveys, Inc. indicated that the company's percentage of the database market fell from more than 60% in 1989 to 48.6% today.

Ashton-Tate also moved to broaden its user base into the expansive Sun Microsystems, Inc. marketplace last week with the announcement of Dbase IV for Sun, a full implementation of Dbase IV Version 1.1 for the SunOS operating system. The product is slated for fourth-quarter availability with prices beginning at \$995.

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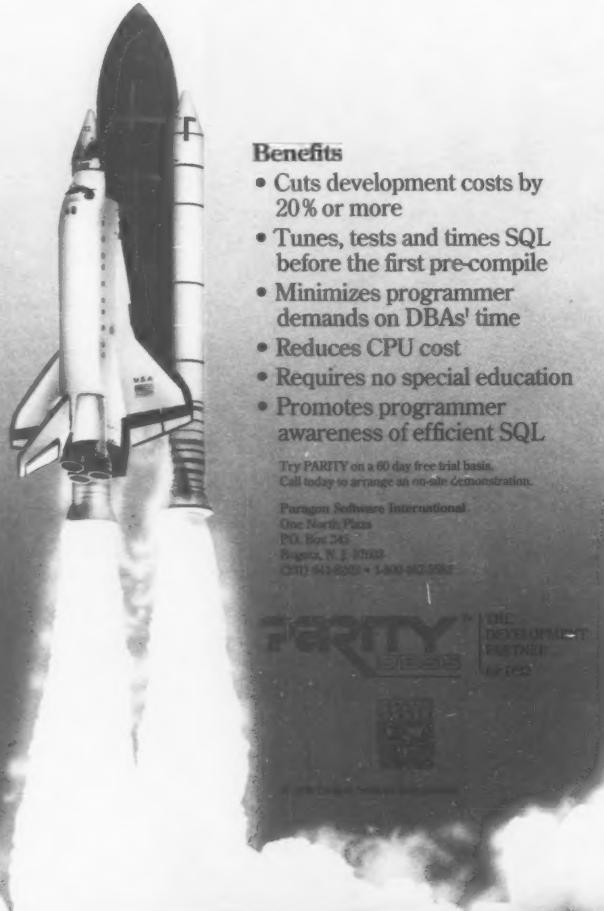
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Stoll to star in Nova adaptation

Clifford Stoll, the astronomer-turned-computer gumshoe-turned-best-selling author (*The Cuckoo's Egg*), is now a television star. On Oct. 2, the Public Broadcasting Service's *Nova* series will begin its 18th season with *The KGB, the Computer and Me*, a reenactment of Stoll's book starring Stoll as himself.

While working at the Lawrence Berkeley Lab in California, Stoll became internationally famous in the world of hackers when he traced a 75-cent discrepancy in a computer billing report to a group of West German hackers. These infamous hackers were gathering military intelligence and selling it to the KGB. Though investigators disbelieved him, Stoll relentlessly pursued his quarry, and the authorities eventually jumped in and busted open the hacker/spy ring. His account of the incident became a best-selling book.

"This is a classic mystery story, but it takes place against a totally new landscape of data networks and computers," said Robin Bates, producer of the program. While following the book's plot line, the show offers exclusive interviews with the hackers themselves, including the ringleader Marcus Hess. "You get a good idea of what the hacking scene is like in Germany," Bates said.



Stoll stars in TV
hacker plot

digital update

NEWS AND VIEWS SEPTEMBER 1990

It's APPENING again.



At a recent Gartner Group conference on storage products, ten percent of the participants said that they now have more than one terabyte of data stored in their computer systems. That's a lot of data.

And certainly a sign of the times—as we stand on the threshold of yet another massive growth of data collection, with the ability to incorporate image, voice, and unstructured objects into computer storage.

Until now, the logical solution has been to create bigger, faster disk drives, meeting the challenge of sheer quantity with devices that can store trillions of bits and retrieve them in millions per second.

But, as we move into the 1990s, focusing on quantitative advances in storage capacity alone no longer solves the problem of staying ahead of the information explosion. "More" and "faster" are not enough. Such solutions do not take data safety into account. Nor do they consider the subtleties of data priorities, or the complexities of meshing various tech-

nologies and topologies to achieve the most efficient combinations.

Storage and data availability are indeed critical issues. Because all the processing power in the world, all the networking capacity, the most highly-evolved operating systems, and the best applications will mean nothing if the right data isn't available at the right time, from the right source, for the right user.

How to meet this storage challenge? Digital feels the answers come via high availability subsystems, robust storage system

management, and balanced I/O performance—as embodied in our Digital Storage Architecture (DSA).

DSA

A Leadership Approach

The Digital Storage Architecture is the most advanced storage architecture in the industry, offering unparalleled investment protection.

DSA is designed to optimize the use of system resources, with high data integrity and availability, balanced I/O performance, and low cost of ownership. This is accomplished through its almost complete independence of hardware and software changes, as well as the robustness to withstand changing technology.

The result is the ability to migrate DSA devices across the Digital product line, giving almost unlimited flexibility and extensibility, plus easy incremental growth.

DSA does this by separating the physical characteristics of the storage devices from the "logical" view that the application program has of them. For example: the DSA concept of a disk device is simply a randomly accessed collection of fixed length logical blocks; the concept of a tape is a sequentially accessed collection of variable length logical blocks.

continued ▶

The DSA Family

Currently, there are two major implementations of DSA:

(1) The high-end SDI (Standard Disk Interface) implementation, which utilizes the HSC70, KDA50, KDB50, and KDM70 controllers, to attach the ESE20 solid-state disk, the RA series of disks, the SA series of disk arrays, and the TA series of tapes (such as the TA90) to all of our system buses.

(2) The DSSI (Digital Storage System Interconnect), which places the controller function in devices (now called Intelligent Storage Elements) like the RF30, RF31, RF70, and RF71.

For more information on these DSA products, or any other Digital products and services, call 800-DIGITAL (800-344-4825).

► Storage Solution
continued

DSA isolates the I/O subsystem from the host, allowing intelligence to be placed in the subsystem itself, and off-loading the host from the chore of managing and tracking the actual I/O operation. Thus, a large number of I/O commands can be queued up in the storage subsystem and then returned in the most optimal manner.

Storage Management Affords Higher Data Availability

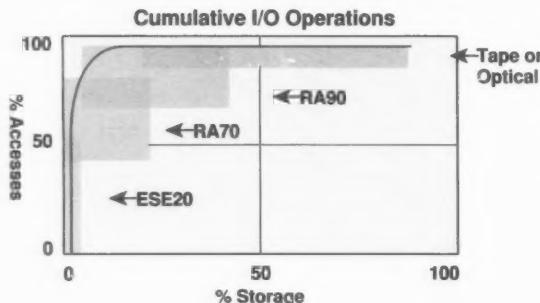
When it comes to something as crucial as data availability, Digital works with a very simple equation:

Reliability + Fault Tolerance + Fault Management = Data Availability.

Our products are already quite competitive in reliability. But no matter how high the reliability, problems can still occur across a large number of devices. And creating fault-tolerant systems for every application requires far too much redundancy, not to mention cost.

Thus, we've combined the concept of problem prediction with automatic failover to create a fault management system that can achieve high levels of availability—VAXsimPLUS.

VAXsimPLUS is an expert-based fault management system that predicts problems with very high accuracy. It works by constantly monitoring all of the error and status codes for a designated set of Digital storage devices, and then comparing the frequency and patterns of these codes against a knowledge base of failure characteristics for those specific devices.



Balanced I/O performance means matching the need to the storage device.

It utilizes an autopy feature, either with a designated spare disk or with a low-priority shadow disk, to automatically replace the problem device—while online—with no interruption to the users' application.

VAXsimPLUS is available today for all Digital RA and RF disks, plus the ESE20 and TA90 tape system. It can be set up to span disks across networks and VAXclusters on a worldwide basis.

Seeking Balanced Performance

When configuring an I/O subsystem, the objective must be to achieve a balance between CPU performance and the I/O subsystem's ability to access information.

In recent years the growth of CPU power has greatly outpaced the growth of disk I/O performance. As a result, more creative ways are needed to balance the I/O needs—other than just relying on disk technology to keep pace.

The actual response time in an I/O request is highly influenced by the workload

being placed concurrently on the I/O system by multiple users at any given time.

From extensive system monitoring, we've found that roughly 50 percent of the I/O requests go to as little as one percent of the online storage, and 80 percent of the I/O requests go to only 20 percent of the online storage. That high-activity one percent contains a number of small files that are always "hot"; these are easily identified and quite consistent.

This means that the real answer to improved I/O performance is to balance the I/O subsystem by matching the I/O demand to a device that satisfies the performance/cost tradeoff in the most effective manner.

Digital offers a full range of devices that satisfy this I/O demand profile, as well as the tools to balance the load. We say the solution is to place the very hottest files on the fastest member of the storage hierarchy (namely, a solid-state disk, like our ESE20), and then spread the rest of the high-activity files among as many actuators as possible.

Make Room for DSA

For your entire computer system to run effectively over the long haul, you need a storage system that can handle ever-increasing amounts of data—efficiently and cost-effectively.

With DSA, you get high availability, balanced I/O performance, and robust storage management—working to bring every user instant access to a world of information.

And that's what computing is really all about.

Shopping for Storage



Here are several key criteria that can be helpful in evaluating storage systems:

High Availability

Check for full DSA compliance, which brings with it the benefits of DSA high data availability and integrity features, such as complete status and error reporting.

Balanced I/O Performance

Look for actual "delivered" I/O performance—not just mechanical specifications.

You'll want performance figures under actual workloads that take into account all factors, not only seek time, but also rotation, data transfer, and command overhead.

Cost of Ownership

Compare the statistics on full cost of ownership, including purchase price, maintenance costs over time, residual value, and cost of downtime. You'll see for yourself that raw specs and upfront costs may not be the most critical factors for the long-term efficiency and cost-effectiveness of your storage system.

... NEWS ...



Name Change. The connectivity products clustered under Digital's Personal Computing Systems Architecture (PCSA) have been named DEC LanWORKS and DEC EtherWORKS. Some examples of this new nomenclature include: VMS Services for PCs, now DEC LanWORKS for VMS; DECnet

PCSA Client for DOS, now DEC LanWORKS for DOS; PCLAN/Server 3100, now DEC LanWORKS 3100—to name a few.

New Name. Digital's integrated CASE environment is now known as COHESION. Designed to support the unified development, deployment, and management of software, the COHESION environment is built on Network Application Support (NAS). It supports the development of NAS applications as well as software for IBM mainframes, plus a range of microprocessors and supercomputers.

More MUMPS. Digital recently announced a new version of its MUMPS software implementation—VAX DSM (Digital Standard MUMPS) Version 6. This provides users with new transaction processing capabilities, failover recovery in a

VAXcluster environment, enhanced security, and portable runtime software for integration of applications with other MUMPS systems.

New Interface in Place. As Digital's implementation of the ISO Manufacturing Message Specification (MMS) standard, the DEComni/VMS network interface now enables VMS-based applications to communicate directly with plant floor devices such as PLCs and robots from multiple vendors. Applications do not need to be rewritten, thus reducing the need for communication software.

Turn on a VT420. Digital's new generation of terminals—the VT420 series—offers dual-session capability, off-screen memory, faster communication baud rates, a shorter keyboard, and improved ergonomics.

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VAX-11/750	MicroVAX 3800	DV-380U3-AA	DV-380T1-AA	95,000
VAX-11/78X (780 or 785)	VAX 4000-300 Unlimited VMS	DV-43JU1-C9	DV-43JU1-A9 (+QL-001A2-B4)	125,000
VAX-11/78X (750,780,785)	VAX 6000-210 Base VAX 6000-310 Base VAX 6000-410 Base VAX 6000-210 VAXcluster VAX 6000-310 VAXcluster VAX 6000-410 VAXcluster	62XMC-AE 63XMC-AE 64XMC-AE 62XCC-AP 63XCC-AP 64XCC-AP	62AMB-AE 63AMB-AE 64AMB-AE 62ACB-AP 63ACB-AP 64ACA-AP	164,000 219,000 294,000 184,000 244,000 319,000
VAX 82XX	VAX 6000-210 Base VAX 6000-310 Base VAX 6000-410 Base VAX 6000-210 VAXcluster VAX 6000-310 VAXcluster VAX 6000-410 VAXcluster	62XMF-AE 63XMF-AE 64XMF-AE 62XCF-AP 63XCF-AP 64XCF-AP	62AMB-AE 63AMB-AE 64AMB-AE 62ACB-AP 63ACB-AP 64ACA-AP	159,000 209,000 274,000 184,000 234,000 299,000
VAX 83XX	VAX 6000-310 Base VAX 6000-410 Base VAX 6000-310 VAXcluster VAX 6000-410 VAXcluster	63XMH-AE 64XMH-AE 63XCH-AP 64XCH-AP	63AMB-AE 64AMB-AE 63ACB-AP 64ACA-AP	199,000 269,000 224,000 294,000

* "DV" Easy System Upgrades deliver a preconfigured MicroVAX 3XXX.

VAX 4000 and VAX 6XXX Easy System Upgrades deliver a VMS Base System.

** All prices are U.S. and subject to change.

*** New offering as of July 2, 1990.

Print It with a Digital Printer

From dot-matrix to laser, for most any application, in any environment, networked or stand-alone, and across all price ranges—Digital has the printers you need.

The following gives you a complete picture of our extensive printer families, including a few new members.

Introducing the DECaser 2000 Family

Digital recently introduced two new laser printers to support a wide range of printing needs—the DECaser 2100 and DECaser 2200.

As replacements to the LN03 and LN03 PLUS printers, both these printers are designed to fit on your desktop or on an optional printer stand. Both handle multiple paper sizes and transparencies, and print up to 10,000 pages per month.

The DECaser 2100 prints one-sided (simplex) documents and offers a single input paper tray which can be adjusted to handle multiple paper sizes.

The DECaser 2200 prints two-sided (duplex) documents. It offers two input paper trays so that you can have two different types of paper sizes loaded into the printer at the same time. It also can accommodate the optional envelope feeder.

Both these printers are currently available and ready to work—either in a networked printing environment on a terminal server, or for personal printing on a video terminal, printer port, or PC.

The new
DECaser
printers.



Did you know?

... that you can bring the power of PostScript to all your Digital printers? DECprint Utility for PostScript to Sixel Printing for VMS Software is a software product that enables you to do just that. It's a less expensive way for you to use an existing sixel printer for your low-volume printing needs.

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Something for Every User, Every Task, Every Place

Word processing, data processing, electronic publishing, business graphics, science and engineering—whatever the application, Digital offers a choice of printers that can handle the job. Not to mention a selection that can work well in a variety of environments—from individual workstations to small department and office clusters, large offices, or computer rooms.

Here's a brief description of our printer families:

Dot-Matrix Printers

LA70 Personal Printer:
LA75 Companion Printer:
LetterPrinter 210 (LA210):
LA324 MultiPrinter:

Low-cost, dot-matrix, simple business graphics.
Dot-matrix, simple business graphics.
Dot-matrix, text and graphics with wide carriage.
High-resolution, wide-carriage, impact dot-matrix.

Print Band Printers

LP37:
LP29:

1,200 lines per minute, monthly output 150,000 pages.
2,000 lines per minute, monthly output 300,000 pages.

Line Dot-Matrix Printers

LG31:
LG01:
LG02:

300 lines per minute, monthly output 25,000 pages.
600 lines per minute text only printer, monthly output 50,000 pages.
600 lines per minute text and graphics printer, monthly output 50,000 pages.

Networked Laser Print Systems

PrintServer 20 (LPS20):
PrintServer 40 Plus (LPS40 Plus):

20 pages per minute, simplex and duplex printing,
monthly output 40,000 pages.
40 pages per minute, simplex only printing, monthly output 100,000 pages.

Desktop Laser Printers

LN03 Image (LN03Q):
ScriptPrinter (LN03R):
DECaser 2100 (LN05):
DECaser 2200 (LN06):

Fast laser printer for compound documents.
8 pages per minute, desktop, PostScript laser printer.
8 pages per minute, sleek desktop laser printer for simplex printing.
8 pages per minute, sleek desktop laser printer for simplex and duplex printing and two paper trays.

Color Printers

Companion Color Printers (LJ250/LJ252):

Seven color (plus white) ink-jet printer, which gives you up to 256 colors; in parallel and serial versions for sixel printing.

For More Printing Power:

The PrintServer Family

Do you have an ideal printer in mind? One that brings you more speed, more typefaces and font styles? One that prints images, and can put multiple pages on a single piece of paper so you can see the flow of an entire presentation at once? How about one that even manages itself?

You can have all this and more with Digital's PrintServer 20, a 20-page-per-minute duplex networked laser printer. Or with the PrintServer 40 Plus, which prints up to 40 pages per minute.

This PrintServer family is made for sharing. If you use VMS, ULTRIX, UNIX, MS-DOS, or Apple Macintosh operating systems, the PrintServer family offers you complete, shared printing solutions. If you have a UNIX LAN with Sun workstations, you can still use this printer for your department's printing needs.

Digital's PrintServer 20 and PrintServer 40 Plus are networked laser printers connecting to standard Ethernet networks. Chances are, you've already made your Ethernet investment, so all you need to do is hook up the printer and start printing. Depending on your Ethernet environment,

the PrintServer family offers printing support for VMS, ULTRIX, and Berkeley-based UNIX systems on Ethernet networks.

Will these products handle all your applications? We think so.

Applications that support PostScript printing are easily accommodated. The PostScript page description language, by Adobe Systems, Inc., offers 29 resident PostScript typefaces in a variety of sizes, weights, and styles. You can even rotate type, and print textures, patterns, and halftones. And you can print scanned images within your documents.

For those applications that support other printers, the PrintServers have software interpreters which translate ASCII, ANSI/sixel, ReGIS, and Tektronix 4010/4014 files into PostScript language output.

All this, and you don't have to worry about print management functions. The PrintServer software handles these functions automatically—the software communicates with the computer system's printing job and the PrintServer system.

ADVANCED TECHNOLOGY

TECH TALK

Upscale coding system

■ United Parcel Service (UPS) has begun testing a new package encoding system that has greater information density than traditional bar coding and can be read by a scanner while moving rapidly on a conveyor belt. Called the Upscode system, the UPS-designed code contains approximately 100 alphanumeric characters on a 1-in. square label. The cells contain customer shipping information and can hold 30% to 50% more data than conventional bar codes. The new system speeds package sorting, UPS said.

Speedier processors

■ AT&T Microelectronics in Berkeley Heights, N.J., has combined six of the world's fastest computing digital signal processors (DSP) on a single industry-standard circuit board to help computer developers create and simulate advanced applications in graphics, audio, images and other areas in real time. The AT&T digital signal processors are mounted on a high-bandwidth VMEbus circuit, which developers can plug into a system under development, adding significant signal-processing power. The VMEbus-linked DSPs can achieve 150 million floating point arithmetic operations per second, according to AT&T.

Gigabytes in cartridges

■ 3M Co., the inventor of 1/4-in. data cartridge technology, is close to finishing development work on a new high-performance 1.35G-byte data cartridge system. The company has shown off a prototype of the new drive, which features sustained read-and-write operations at 120 inches per second, edge and burst seek for the 30-data track layout of the QIC-1350 format, full track erase capability and a single-plane read-while-write head. The SCSI-based drive provides a sustainable data transfer rate of 597K bit/sec., more than three times faster than 4mm digital audio tape drives, 3M said last week.

BY SALLY CUSACK
CW STAFF

If you have ever talked to a computerized speech-recognition system, you know that you have to speak very slowly and very clearly to get the machine to understand you.

Responses charged with anger, fear or anxiety or efforts to compensate for a noisy background can cause significant changes in a person's speech patterns, said Mark Clements, professor of electrical engineering at the Georgia Institute of Technology in Atlanta.

Clements and fellow researchers have discovered that there are some consistent patterns of "stressful speech" across a broad range of speakers. These patterns could help a speech processor automatically filter out the emotional component, allowing the machine to more easily recognize the remaining "normal" speech.

To function properly, recognition devices must be "trained" in what each combination of sounds means. Because each person produces slightly different sound patterns when speaking the same words, today's most reliable equipment, trained to respond to a single individual, is useless in general situations.

The Georgia Tech research team has isolated a key component of human speech that could aid automated recognition devices in understanding different persons with a diverse range of vocal styles. Called "glottal waveforms," they are produced by the periodic opening and closing of the vocal cords located at the upper part of the larynx.

This opening and closing function is the impetus that generates actual sound, and recent study has shown that individual glottal waveforms are susceptible to stressed conditions. Experiments have proved that there are certain consistencies across different speakers and different phrases — a predictable pattern of modification — that machines could be programmed to identify.

Kathleen Cummings, a graduate student and researcher, said the uni-

versity has developed a method of extracting the glottal waveform from the overall speech waveform using digital signal processing technology. The process of separating the two is called "deconvolving" and currently is being performed with the aid of a Sun Microsystems, Inc. Sun-4 workstation and optical disc technology.

"We also use two different databases. One is a stressed speech database from MIT's Lincoln Labs, which was developed using nine actors," said Cummings. The other is a "repository we created on our own, using sound that has been stored and digitized onto

an optical disc."

Cummings said that the scientists must figure out how to filter out both the emotion and identity of the speaker before standard word recognition can be implemented successfully across a broad range of applications.

One of her colleagues in speech research, Beth Carlson, also a graduate student, foresees a variety of commercial applications, including telephone catalog orders, credit card and banking transactions and speech-synthesized learning toys for children. Carlson is focusing her research on methods of reducing and eventually eliminating the effects of outside noise interference on speech recognition machines.

"Noisy environments are more common than not," she said. "I am looking at a particular distance measure that is found to emphasize or de-emphasize speech patterns most and least affected by noise." Carlson has found that the distance measure can be used to identify those parts of the speech signal that are similar.

In the commercial sector, there are currently several products in the works to advance the speech-recognition market. Texas Instruments, Inc., headquartered in Dallas, has been researching and developing applications for several years, with a primary focus on the telecommunications industry. "We must be able to provide speech recognition capabilities independent of the type of telephone used or the quality of the channel," said Joe Picone, a senior member of the technical staff.

Computerworld national correspondent Mitch Betts contributed to this report.



Georgia Tech's Cummings (left) and Clements study glottal waveforms consistent in stressed speech

Spread spectrum secures client/server systems

BY J. A. SAVAGE
CW STAFF

Client/server architecture lets users have freedom of configuration at a good price. What it does not do is adequately protect data security and provide an elegant physical path to move data around a local-area network.

An emerging method of network communication, spread spectrum technology, scrambles data at the sending end and unscrambles it in receipt to protect your data's security — at least within individual networks. By using radio waves, it also allows information to be zapped across LANs with-

out the need for a Medusa's head of cabling.

Not surprisingly, spread spectrum spreads data across a wide frequency bandwidth. It also operates at low power. This is unlike FM radio, for instance, which sends over a narrow band at high power. Data is sent in a "pseudorandom" sequence instead of sequentially. The receiver is tuned to the same sequence to decode and reassemble the data.

Usually, a piece of information is transmitted as a pulse. Spread spectrum takes that pulse and turns it into a complex bar graph, according to Bert Keely, director of marketing for Agilis Corp. a Mountain View, Calif.-based

spread spectrum company. "Every bit is split into 16 chips and sent out through the air," he said.

Developed by the military during the last few decades, spread spectrum is attractive in surveillance for two reasons: It is difficult to intercept because the power is so low, and it is difficult to jam because the spectrum is so broad. "To jam it, you'd have to send out such a broad noise of your own that you'd end up jamming your own system," said Julius Knapp, deputy chief of the authorization and evaluation division of the Federal Communications Commission in Columbia, Md.

Companies like Agilis, Qualcomm, Inc. and Cylink Corp. are applying the military's development to computer networks. Agilis, for instance, has 16 different sets of senders and receivers. Theoretically, 16 different LANs could operate within close proximity without getting confused, and the data would be secure within those LANs.

EDITORIAL

Wild pitch

HERE IS NO joy in relational database-ville. Once-mighty Oracle has struck out. In saying two weeks ago that it expects to report its first-ever quarterly loss, Oracle has become the latest shooting star to lose some of its twinkle. Oracle's problems are indicative of a general malaise in the relational database community, one that may be far more serious for smaller companies — and their customers — than for market leaders.

Last week, Ingres decided against continuing the battle alone and sold out to Ask Computer Systems. Sybase, which looked to be on top of the world at one point after receiving endorsements and cash infusions from Apple and Microsoft, has laid off 10% of its work force.

Like most firms that hit a rough spot, RDBMS vendors blame the economy. That's part of the problem, but this story is beginning to sound familiar. A market category heats up, causing a lot of vendors to rush in to fill the void. Competition intensifies, leading to overblown promises, some of which are actually kept. Vendors resort to price-cutting in a mad dash to get their sales figures up to the levels necessary to avoid a stock market bloodbath. Books are juggled to shine the best possible light on quarterly profits.

Eventually, Humpty-Dumpty always falls off this wall. Unkept promises begin to turn off potential customers, while thinner margins created by price-cutting create pressure on the bottom line. Companies eventually face the choice of where and how dramatically to cut expenses. Some, such as Ashton-Tate, elect to take the hit all in one quarter. Others, such as Cullinet, let the blood ooze until there's no strength left.

Either approach is bad news for customers. Choosing a database vendor is a long-term decision involving mission-critical software that ties the user tightly to the vendor. Although the buying decision may be strategic, users are still prone to respond to short-term price cuts and new product promises made by vendor representatives anxious to close the sale. That's only natural when the buyer is under pressure from above to make the choice that will cost the company the least in the next fiscal quarter. Vendors are all too willing to play this game. Promises don't cost nearly as much as R&D.

The old saw "you get what you pay for" holds true here. The industry has shown that discounting isn't a long-term strategy. Remember the low-cost PC software wars some years back? How many of those firms are around now? What's left of the discount plug-compatible mainframe market that flourished in the early 1980s? Isn't price-cutting usually a response to a problem, rather than a strategic thrust?

There's no reason to think the profit problems in the RDBMS sector are anything more than a hiccup. The technology continues to hold promise as the most effective way to manage information in a downsized and distributed environment. Let's hope that these latest problems will cause some introspection and lead to a more measured view of what constitutes value for the dollar.



LETTERS TO THE EDITOR

Look and feel good

Regarding the Viewpoint section [CW, Aug. 13] on the arguments for and against the "look-and-feel" decision in the recent *Lotus Development Corp. v. Paperback Software International, Inc.* court case, it may be instructive to look at what is going on in another segment of the computer software market. IBM is actively promoting Systems Application Architecture (SAA) for use on its machines. SAA is likely to provide the same look and feel on different machines running different applications.

A software developer in New York and another working independently in California, using SAA methodology on an IBM Application System/400, are likely to produce software that has the same look and feel. The command and function keys will be the same, and the menus and screens will be similar.

Why does IBM promote this? Probably because it might help them sell more machines. If Lotus ever provides 1-2-3 for the AS/400, as has been rumored, it will be interesting to see what the look and feel of the product is like.

Leon F. Stewart
President
Britz Publishing, Inc.
Madison, Miss.

System geriatrics

Judith Finn's feature article on older machines [CW, Aug. 20] was an excellent presentation of the reasons for using machines that could be termed obsolete. However, the article did not discuss one of the critical drawbacks of this strategy: the difficulty of retaining and attracting skilled technical personnel.

The best technical people generally have a strong preference to work with the latest technology; to do otherwise is regarded as a career risk because the programmer may be viewed as obsolete if he or she works with an outdated system. As a result, the true cost of maintaining an older system may be higher than expected because some programmers will have no interest in working with these systems, and those who will consider these positions may require increased financial incentives. This situation is occurring in the IBM midrange market. One of the foremost concerns of programmers interviewing with System/36 and System/38 shops is when the conversion to an Application System/400 will occur. An unsatisfactory answer to this question by the hiring manager may kill the prospect's interest in the position.

Eugene Brian Sawyer
Analytical Consultant
Whitman-Hart
Lombard, Ill.

Aesop story

I read with interest your article "The real Japan" [CW, Aug. 13]. It is indeed remarkable that Japan has managed to emerge from the ruins of the past and become an important international player and ally. It is also rather obvious that the U.S. has been resting for too long on its own economic and technological superiority while other countries were busy trying to catch up.

This complacency and over-reliance on past performance can backfire, as the familiar "hare and tortoise" fable tells us. America needs to return to its traditionally exploratory and entrepreneurial spirit in order to regain its past momentum. Ad-

vanced research and constant innovation are needed to improve our competitiveness. We should be striving for quality solutions and products and not be misled by the illusion of "short-term" profits. This will help us compete successfully in the global marketplace and thereby restore America's place in the world.

Dr. Gus A. Galatiнос
President
Advanced Computer
Consulting International
Whitestone, N.Y.

Need for speed

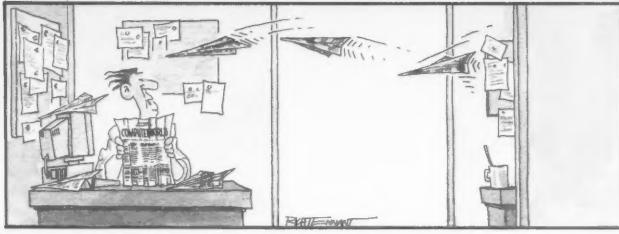
Your review on "Power, flexibility 1-2-3/G's strong suits, but not speed" [CW, July 30] is very good. You have come to the same conclusion that many of us have. It's a powerful product, especially now with the addition of the "what-if" Solver utility, but it lacks recalculation speed.

I have one question that has been asked at numerous trade shows and of 29 operators at Lotus: Is Lotus going to have support for the Intel i860 math coprocessor, which is now in production? The 80387 is really no help, and this seems to be the right answer.

They have the operating system and now the product; all they need is speed.

Michael Della Bella
PC Software Support
Edith Roman Associates, Inc.
New York

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Labers, Editor In Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD.



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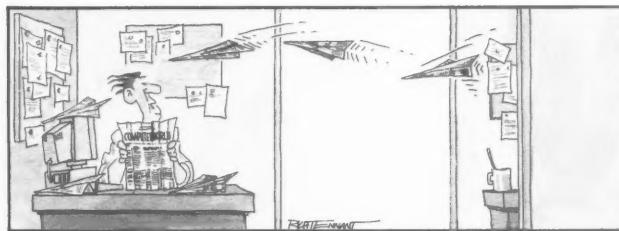
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- 23. Dir/Mgr Sys. Development, Sys. Architecture
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- B. Minicomputers/Small Business Computers
- C. Microcomputers/Desktops
- D. Communications Systems
- E. Local Area Networks
- F. No Computer Involvement

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- 65. Communications Systems/Public Utilities/Transportation
- 70. Mining/Construction/Petroleum/Refining/Agric.
- 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
- 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
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- 95. Vendor: Other

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- 31. Mgrs., Suprv. of Programming, Software Dev.
- 32. Programmers, Software Developers
- 60. Sys. Integrators/VARs/Consulting Mgt.
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Stay put, or keep moving up?

FRANK GENS

On Sept. 5, IBM changed the rules of the mainframe world in a big way for customers and competitors. With the announcement of the Enterprise System/9000 family, Big Blue delivered on its unprecedented promise to provide physical upgradability from the 3090J line to the ES/9000. By announcing upgrade prices that are attractive enough to encourage many customers to follow that path, IBM has added a new weapon in its battle to maintain account control.

The upgrades from the 3090J to the ES/9000 have several important impacts. The new migration paths will do the following:

- **Lower the customer migration barrier.** Customers are likely to move more quickly to the ES/9000 because they are able to move to the next platform incrementally (via upgrade) without having to go through the pain of getting authorization to acquire a completely new footprint. The upgrade path makes moving to the ES/9000 simpler for many customers who might otherwise have stretched out such a decision. This has a posi-

Gens is vice-president at Technology Investment Strategies Corp., a market research firm in Framingham, Mass.

tive impact in keeping IBM's revenue flow steadier than in earlier mainframe transitions.

• **Limit plug-compatible manufacturer opportunities and maintain IBM market share.** Customers who are adding capacity via an upgrade are much less likely to seek competitive bids from Amdahl or Hitachi Data Systems than those planning a box swap. By allowing a large number of customers to upgrade to the next platform, IBM is effectively preempting the PCMs from competing in many of those migrations. Thus, upgradability provides IBM with a strong weapon in its attempt to shore up its market share and maintain account control.

• **Maintain IBM Credit Corp.'s hold on the lease base.** When a user who leases a system looks to upgrade to a larger system, the incumbent lessor — who holds title to the box that will be upgraded — is in a much stronger position than any lessor who wants to compete for the lease on the upgrade. Thus, IBM's upgrade strategy for moving 3090J customers to ES/9000s will provide lessors who have a strong share of the 3090J market with an equally strong share of the ES/9000 lease business. IBM Credit Corp. reportedly did 70% to 80% of the lease deals on 3090Js. It is now clear why it was so aggressive: It will be able to leverage its J position into an equally strong

position on ES/9000s.

But it's hardly time to blow "Taps" for Amdahl and HDS. Upgradability has been the rule for the past five years within the 3090 family, and Amdahl and HDS have certainly done pretty well. During this mainframe transition, it won't be any harder for PCMs and independent lessors to take business from IBM (and ICC) than during the past

adding capacity via upgrades rather than through a box swap. Indeed, enough customers favor the upgrade strategy that IBM currently receives more than 50% of its large systems hardware revenue from mainframe upgrades.

Happily for Amdahl and HDS, there is a very important community which has demonstrated very little interest in upgrades: IBM's largest customers. These accounts — many with a large number of 600 J-class IBM and PCM systems installed — often

box-swap) that IBM has announced, upgrading to the ES/9000 will be even less relevant to the large shop.

Upgradability will also be of mixed interest to 3090 non-J shops. With about two out of three 3090 customers still in S, E or Base machines, this community is very important to IBM's mainframe plans. From a price/performance standpoint, customers with 3090 Base, E or S systems have less of an incentive to move to the ES/9000 via upgrade than do J customers. Further, non-J customers must go through the logistical headache of upgrading to a 3090 J before stepping up to an ES/9000.

As customers evaluate the ways in which they may move to the next generation of IBM and PCM mainframes, they should draw upon the No. 1 lesson of 3090 upgradability: While upgrades offer an attractive, non-disruptive way to add capacity and features, the nondisruptive installation of an upgrade is sometimes accompanied by a noncompetitive price.

Thus, customers shouldn't simply default to an upgrade whenever more capacity is needed. It is important to remember that there remain viable alternatives: PCM systems, used IBM and PCM systems, upgrading used IBM systems, etc. As noted earlier, upgrades tend to maintain the status quo. And, as the largest of IBM's accounts know, the best-priced solution is presented not in the status quo but in a competitive, customer-controlled environment.



Nicolas Ancia

several years. It just won't offer as rich an opportunity to step into new accounts as earlier transitions provided.

Obviously, the success or failure of IBM's upgrade strategy will depend on customers' behavior. I believe the reaction in the average 3090 J shop will be very favorable. During the past five years, many customers have demonstrated that they prefer

are more inclined to roll in an entirely new system than to upgrade installed machines. Many large customers maintain a swap strategy to "keep IBM honest" by showing a willingness to replace an IBM system wholesale with an Amdahl or HDS box.

Further, because the physical upgrade path for 600 J customers is less attractive than the "financial upgrade" (discounted

One man's 'natural' is another's 'what is this?'

HARVEY P. NEWQUIST III

There has been a tremendous amount of discussion lately over the merits of computer input devices, especially with the recent introduction of a slew of products that feature handwriting recognition. Along with the hype surrounding this form of data input, there is also increasing talk of the use of natural language to improve the querying efforts to a variety of systems. Yet, whether the method is handwriting, voice, conversational English, touch screens or any of the other ballyhooed technologies, it all boils down to natural interfaces.

But just what is a "natural interface?" I'm sorry, but to me,

Newquist writes and consults on artificial intelligence and other advanced high-technology topics from his office in Scottsdale, Ariz.

and probably to thousands of people who've been using computer keyboards for the past decade, handwriting is no longer natural. Not only has my handwriting never been good (I nearly failed the Palmer Penmanship course in fourth grade), but its quality has fallen dramatically in the years I've used a keyboard.

It's also a pain; when I sign checks, I get hand cramps before I even fill out the date line. Legibility is therefore a problem for me in using anything that depends on the chicken-scratching that I call handwriting. I can't expect a machine to recognize something I've written that I can barely decipher myself.

Voice recognition is being touted as an even more natural interface — perhaps the ultimate interface that humans will use to control computers. That's fine when you are accustomed to uttering one-word answers or creating memos that aren't longer than one or two sentences.

But have you ever used a dic-

taphone, or tried to compose a grammatically correct report using a tape recorder? Unless you are an experienced "talkie," you will find that dictating a memo is a hell of a lot more difficult than typing it. I have a lawyer friend who swears by recording devices such as dictaphones, and he is capable of whipping out dozens of memos and letters per day by using his microphone-based interfaces. On the other hand, he will not consider using a keyboard. Watching him at a computer keyboard, I can understand why: His slow hunt-and-peck search on the keys gives one the kind of pained anticipation that parents feel watching their kids trying to ride a bike for the first time without training wheels.

What you like

The point is simply that "natural" depends in every case on what the user feels most comfortable doing. Natural to me is certainly not natural to my lawyer friend or to someone like my grandmother, who insists on handwriting every piece of correspondence she undertakes.

Then there is the issue of what constitutes natural language to an experienced computer user. Having used DOS

ever since it was introduced (and having the emotional scars to prove it), I still habitually omit spaces between commands in other environments because DOS does not allow for blanks. I work with people who were weaned on Macintoshes, and when faced with DOS interfaces (or something really fun, such as Ashton-Tate's Dbase), the first thing they want to know is, "Where are the mouse and the screen icons?" Clearly, natural here is also a question of preference and experience.

In writing about natural language for years as part of the artificial intelligence business, I have seen many attempts to create front ends that use conversational English instead of the strange little grammatical bastardizations that make up computer jargon. Being familiar with Dbase commands, for instance (a fact I'm not necessarily proud of), I can get almost any information I want out of my personal computer with just a couple of macro keystrokes or some tersely worded commands. They were not enjoyable to learn, but these commands now work more quickly for me than trying to formulate the same system request in plain English.

Another problem with creating a universal natural interface of any kind, whether it be keyed-in English, spoken word or handwritten word, is that almost everything is context-specific. This means that if you're George Will, the use of the word "run" probably has something to do with the score of the Yankee game. If you're in quality control at Hanes, "run" probably means a tear in a nylon stocking. If you're in any data center, "run" means the execution of a specific system process. The *Random House Dictionary* has 179 definitions for "run," most of these context-specific. In asking computers to understand a spoken or written word, then, we must either provide the machine with a context for understanding, or make it intelligent enough to figure out what the user means.

Thus, tagging any technology with the promise of revolutionizing the industry as we know it, especially where it concerns input devices and the way users relate to their machines, is going to have to be taken with so many grains of salt. Before you toss out your keyboards for the allure of handwriting or voice input devices, remember that you may be committing an unnatural act.

The real trick is not to wait: Become your own IS director

READER'S PLATFORM

GARY BERLIND

David Liddle's Viewpoint article, "Business computing gets stuck" [CW, Aug. 20] exposes the disparity between the vision that computer folks have long held for the automated workplace and the ever-so-boring spreadsheet/word processing reality that prevails today. Surely, the question "Where's the beef?" needs

to be asked, and if Liddle's statement is correct — that 80% of business professionals are still working without a significant computer resource — it is important that we do some contemplation.

At the heart of the matter, however, may simply be what a former colleague of mine was fond of calling SMOP — (a Small Matter Of Programming). SMOP has been around since the first end user purchased his first mainframe, hired his first information systems director and

proceeded to very quickly learn the meaning of patience.

SMOP isn't a bad thing; it's just the time required to get a system built, regardless of the kinds of tools that are being used. Since it took years and years for corporate America to develop its armament of mainframe-based systems, it's only reasonable to allow some time for the development of the "next generation" of office automation applications. Please show a little patience, Mr. Liddle.

How can one compare the ambitiousness of many of today's highly interactive Apple Macintosh- and Microsoft Windows-based departmental systems with their batch-mode and block-mode forebears of just a few years ago? Better tools lead to better systems, no doubt, but it

still takes time for good systems to get put together, no matter how marvelous the technology.

Let us not be distracted by hardware razzle-dazzle either. Though the astonishing advances we've been seeing in hardware technologies now make it possible to have departmental systems far better than (and at a fraction of the cost of) their mainframe counterparts, SMOP remains a software function not a hardware one.

String together a bunch of Macintoshes or personal computers in a local-area network, add a server and wham! Interactivity, file sharing, responsiveness and all the rest. But all the while, SMOP is there too, quietly raining on the entire technological parade. That, I contend, is why 80% of the office is sitting there with its spreadsheets and word processors, waiting stonily for the Applications Messiah to arrive.

Liddle seems to be unaware of the giant strides that have been made in the past two or three years by independent software developers who have been working behind the scenes to develop an impressive array of microcomputer-based vertical applications for business — applications that actually work.

These vertical applications are currently being built by hordes of dedicated developers all over the world, using a palette of tools that would have been unthinkable just a few years ago. From Omnis and 4D to Clarion and Foxbase, a wonderful assortment of tools that allow for the (relatively) quick development of complete application systems for diverse business situations already exists.

Many of these vertical application systems are complete, desktop-based business management packages, often exceeding in power and functionality the business applications that have traditionally taken IS departments years to put together. Because they use PCs and Macintoshes as their workstation-like front ends, the user interfaces of these systems offer the consistency, functionality and ease of use that Liddle is pleading for.

A ground swell

What has begun to take place already is a subtle, virtually unnoticed, but nevertheless very important shift in the way that many of tomorrow's business applications are being built. Not in corporate America, perhaps, where old IS departments dwell, safely ensconced in their impenetrable layers of 20-year-old Cobol code. But in the brave new world of independent desktop business system application development, virtually anyone with enough interest, talent and analytical ability can become his own IS director.

True, not all the efforts coming out of this "IS underground" are going to succeed. But think for a moment about the sheer numbers involved and take heart, Mr. Liddle. Imagine thousands, maybe even tens of thousands of dedicated individuals, working on their own time (and without the hassles of big-company bureaucracies) to solve business automation problems using PCs and Macintoshes, using the most potent programming tools that have ever been available.

The answer to closing the gap between media hype and office reality doesn't necessarily lie in more and better tools but in graciously giving the present situation a bit more time to mature.

Berlind is president of Desktop Innovations, Inc., a Berkeley, Calif.-based software company.



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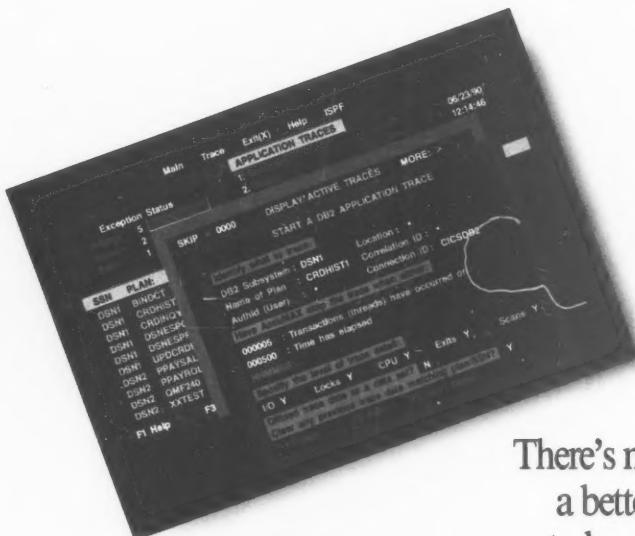
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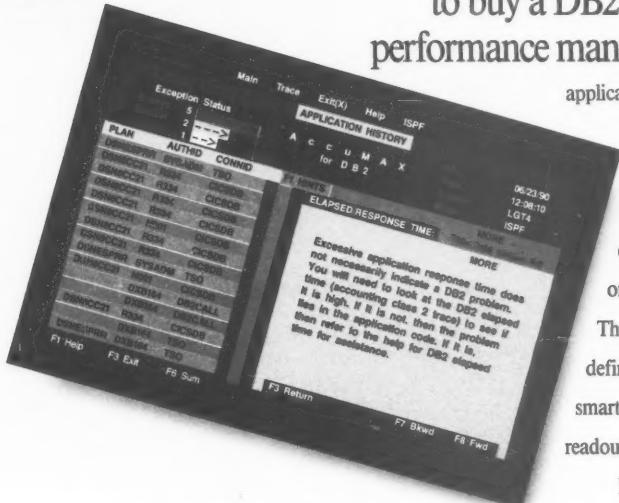
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SYSTEMS & SOFTWARE

COMMENTARY

Gary Anthes

You still can't beat the brain

 The National Commission on Superconductivity recently recommended developing a superconducting computer operating at petaflops speed, or about 1 million times faster than today's fastest supercomputers.

Any way you look at it, petaflops is a lot of floating-point operations per second. It's one quadrillion, a million billion, 10^{15} or 1,000,000,000,000,000 calculations in the time it takes to flick a fly off your nose. It's also the amount of work the fastest Cray supercomputer can do running nonstop for about two weeks or an Apple Macintosh with a robust service contract could turn out in 8,000 years.

The prefix peta is just beginning to creep into computer terminology, extending up the family of power prefixes that includes kilo, mega, giga, tera, peta and exa. If there isn't one already, there will surely soon be a company with a name like Petaperformance Processors, Inc.

Computer enthusiasts and computer journalists love to think about the high, high end of computing, while the low, low end gets neglected. Consider the slide rule. It's good for maybe .2 flops if you really know what you're doing, and that's with lousy accuracy.

The slide rule was invented in the 17th century and disappeared for all practical purposes in the mid-1970s, abruptly

Continued on page 39

Expert systems for everyone

No longer the domain of 'techies,' development tools aim at IS managers

ANALYSIS

BY JOHANNA AMBROSIO
CW STAFF

It used to be that only experts could use expert systems development tools. They were written in obscure languages that few information systems professionals knew, and they required special-purpose, expensive hardware as delivery systems.

No longer. Many expert systems development tools now have the IS manager in mind [see story page 33]. Today's tools are written in C instead of Prolog or LISP, run on a wide range of standard computers instead of on specialized machines and have links into corporate databases.

Users have noticed the change in philosophy. "Integration is where the tools have made the greatest stride," said Ed Mahler, manager of decision support and artificial intelligence systems at Du Pont Co. in Wilmington, Del. "The expert sys-

tems you can develop now are callable from and to other programs and have much-improved database access."

Michael Smith, a senior AI specialist at Eaton Corp. in Milwaukee, has been using expert systems shells since 1985. "Back then, there was nothing that anyone doing actual work could really use. They weren't bug-ridden; they just weren't powerful enough because they lacked too many things," Smith said. Today's tools are much more stable and fully featured.

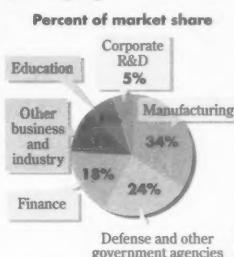
At the customers' whim

Expert systems vendors are responding to the needs of large users. "Most of the vendors are now willing to work for the customer instead of making the customer work for them," said David Blanchard, editor of "AI-week," an industry newsletter.

"The mantle's been passed to the second-generation products and companies that understand MIS and the business world," said Robert N. Goldman, presi-

Industry experts

Expert systems are most likely to have found homes in the manufacturing or government sectors



Source: Expert Systems Strategies

dent of AI Corp., a software vendor in Waltham, Mass. "To the original vendors in the business, this was their college Ph.D. thesis that they then sold. But as smart as they were, they just didn't have the business background to really commercialize the technology."

It is not just software vendors

that are after the IS business. Computer manufacturers including IBM, Digital Equipment Corp., Sun Microsystems, Inc. and Hewlett-Packard Co. also sell expert systems tools that they developed in-house or that they are selling for the software suppliers.

International Chip Corp. in Columbia, S.C., said it believes it has the better system with a hardware/software combination called Rex and Cake. Rex is a chip-based dedicated inference engine that fits into an IBM Personal Computer XT and thus delivers higher performance than software-only schemes, the company claimed. Cake is its expert systems shell.

Even some original expert systems vendors are changing their stripes. Intelllicorp in Mountain View, Calif., was one of the earliest players in the market when it introduced the Knowledge Engineering Environment, a LISP system, in 1983. This June, the company began shipping Kappa PC, a DOS-based tool kit.

Unit tools are coming soon, Intelllicorp President Thomas P. Kehler said. "We had to invest substantially to move to general-

Continued on page 38

Hundreds of packages get ES/9000 nod

BY ROSEMARY HAMILTON
CW STAFF

When IBM rolled out the Enterprise System/9000 recently, it acknowledged the hundreds of third-party software packages that would support the new platform or one or more of its software offerings.

The company has been relying increasingly on this strategy since the successful launch of the Application System/400 two years ago, which was the first time IBM highlighted third-party offerings as a critical compo-

nent of an announcement.

It certainly helps IBM to present a complete package, but it also benefits users by providing them with third-party offerings that are current with the latest IBM generation.

Nearly 150 companies announced support for either the ES/9000's hardware platform or specific software components, including the latest release of the MVS/ESA operating system as well as the ESA versions of the two other IBM mainframe operating systems, VM and VSE. Third parties also announced

support for other IBM software offerings, including DB2, the Enterprise System Connectivity, or ESCON, fiber-optic-based channel architecture and Systemview.

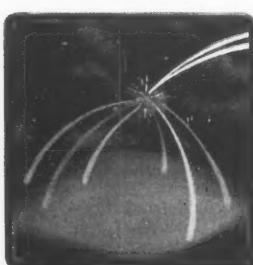
Most well-known providers of application, database and systems software appear on the list of more than 100 companies that will support the ES/9000 platform. These packages include On-line Software International, Inc.'s Ramis application generator; Dun & Bradstreet Software's Millenium and Expert Series of financial, human resources and manufacturing

applications; and Must Software International's Nomad fourth-generation language.

Several vendors targeted specific components of the IBM announcement. Computer Associates International, Inc. pledged support for the ESA version of the IBM VSE operating system.

System software companies such as Boole & Babbage, Inc., Goal Systems International, Inc. and Legent Corp. announced their support for IBM's Systemview, a strategy intended to provide centralized management across an enterprise.

Other companies committed to ESCON include Candle Corp. and SAS Institute, Inc.



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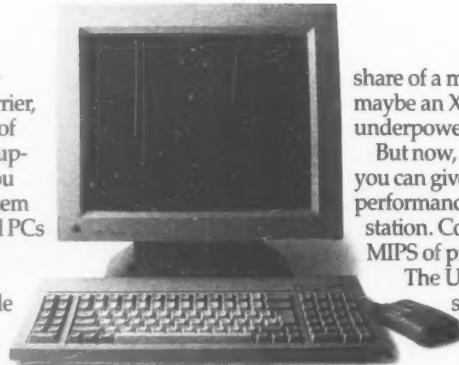
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Simon says soup is good food

Campbell's expert system controls quality, saves more than \$2M per year

ON SITE

BY JOHANNA AMBROSIO
CW STAFF

CAMDEN, N.J. — How does Campbell Soup Co. ensure that its soup is "mm-mm good"? An expert system, chosen and implemented by an end-user department, helps the company determine when something goes wrong with the processing of the soup and what to do about it.

The expert system, dubbed Simon, was installed two years ago and became fully operational a year later. "We tested it for a year to make sure it's right," said Michael S. Mignogna, corporate process authority at Campbell. "We wanted to make sure that when it decided something, it was the same as if one of our people had made the decision." Thus far, the system has saved Campbell's about \$5 million. Simon was written using Aion Corp.'s Aion Development System shell.

Mignogna's department, thermal process development, sets the standards for how soup should be cooked to ensure sterility and to avoid conditions such as botulism. It also makes the calls about what to do if something goes wrong.

For instance, a batch of cream of mushroom needs to be cooked for 50 minutes at 250 degrees, and halfway through the cooking, the plant loses steam pressure or the conveyor belt slows down. Mignogna's group has to decide whether to OK that batch for sale or destroy it. The goal is to destroy as few items as possible while guaranteeing quality. "It's that one can of soup that we worry about," he said.

Before Simon was installed, Mignogna's department used a General Electric Co. time-sharing arrangement. Then in 1985, Mignogna and his engineers converted the time-sharing application to run on an IBM Personal Computer. "I wouldn't say it was

the most efficient system," Mignogna said, "but it worked." And it saved the approximately \$4,500 a month that the time-sharing system cost.

All told, Simon has saved Campbell between \$2 million and \$3 million a year. Most of this is accounted for by products that would have been destroyed under the old system but that were really safe. "That sounds like a lot of money," Mignogna said, "until you realize that

WE WANTED
to make sure
that when
[Simon] decided something, it was the same as if one of our people had made the decision."

MICHAEL S. MIGNOGNA
CAMPBELL SOUP

Campbell makes five billion to 10 billion cans of soup a year."

With the old PC system, whenever there was a problem the plant would notify Mignogna's people and send data about all the conditions. Thermal process would look at the data and use the PC program to do mathematical simulations to decide whether the product was safe. This process took up to eight weeks, and the product in question needed to be held in a warehouse until a decision was made.

With Simon, however, that decision-making process is cut to about three minutes, and most of the decisions are made by Simon with little human intervention. When something goes wrong at the plant, a quality control person enters data into Simon on a personal computer. Four plants have PCs that run Simon locally. Mignogna's group also has a PC with Simon on it.

If the expert system deter-

mines that the problem will not impact quality, it authorizes the product to be released. "It's the same as if I signed it off," Mignogna said. If the problem is determined to be more serious, the product is put into isolation in a warehouse, and Mignogna's group reviews the paperwork and does a risk analysis.

Simon makes the decisions about 90% of the time, Mignogna said. In the other 10%, all the data may not be immediately available. Nor does Simon contain rules for all the possible combinations — such as container defects, for instance. "These are the sorts of things that are not toxic and won't kill anyone," Mignogna said.

Because the expert system can separate the business rules from the mathematical calculations, Mignogna said, either can be changed without affecting the other. This can come in handy when Campbell adds new products or changes the recipes for old ones. When the company introduced its low-salt soups, for example, Simon needed to be changed to accommodate. "Salt



Campbell's Mignogna credits Simon with improving morale

is a preservative, so when you take it out, there's some impact," Mignogna said.

Besides the cost savings, benefits include improved efficiency of the decision-making process and improved morale at the plants, Mignogna said. Plant employees feel more in control of things because they no longer have to wait for his group to

make a decision.

In the future, the Simon systems in the plants and Mignogna's group will be linked so Mignogna can pull information out of the plant PCs. Currently, the only way Mignogna can update his files is to dial into the plant PCs. "We're waiting for our MIS department to make all the connections," he said.

EMC unwraps tool set for IBM's midrange

BY ROSEMARY HAMILTON
CW STAFF

EMC Corp. recently rolled out a package of goodies for IBM midrange users that includes a disk device that can hold up to 17.1G bytes of data, an add-on memory board for high-end users and capacity planning software.

The EMC SL/935-EXP disk device, targeted at IBM Application System/400 and System/38 users, will provide up to five times the storage in the same size cabinet as the IBM midrange storage device, the 9335,

EMC said.

The company also said the device uses only 30% of the electrical power consumed by the 9335 and generates only 25% of the heat. The ES/935-EXP can be installed in either an AS/400 cabinet or a rack enclosure provided by either IBM or EMC. The controller sells for \$5,500 and one head disk assembly unit will cost \$14,500. A complete unit will sell for \$34,000.

EMC will provide add-on memory boards for AS/400 B70 users that are based on 4M-bit memory chip technology. The

32M-byte boards allow B70 users to double main memory from 96M bytes to 192M bytes, the company said. The price is \$24,000.

Finally, EMC has begun offering Systems Management Service, a software package for AS/400 capacity planning. The software is designed to collect data on a daily basis and relay that information to the EMC service organization. Using that data, EMC will compile monthly reports for a customer that analyze current system performance and project future capacity needs.

System Management Service is priced on an annual basis according to CPU size. A typical B70 yearly fee would be \$9,900, while a fee for a low-end B10 would be \$1,830.

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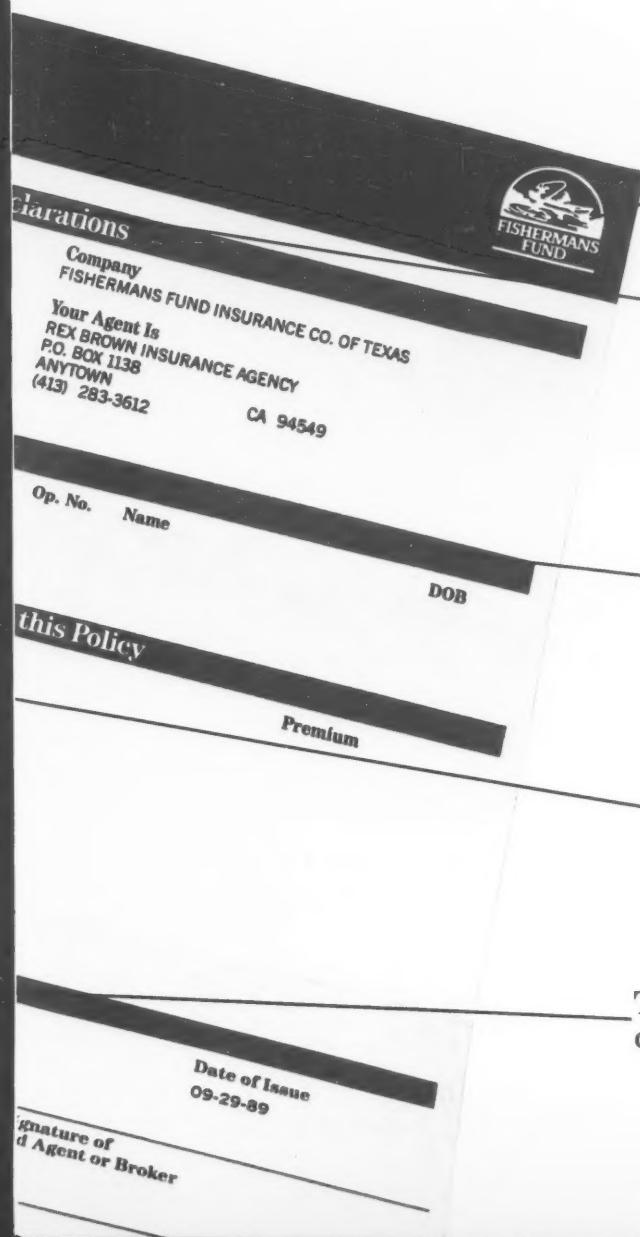
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PRODUCT REVIEW

Cincom's case for integration

Cincom Systems, Inc.

This is the fourth in a monthly series of performance benchmarks that for the next several months will focus on the integration of computer-aided software engineering (CASE) and fourth-generation language (4GL) products. The benchmarks are monitored by an independent team headed by David Whiteside, managing director of Computing Futures Ltd. and his associate, Prof. Eberhard Rudolph, formerly of the University of Auckland, for exclusive publication in Computerworld.

Each product is observed in action over a three-day period, during which a vendor team solves the case study project costing system, an application that is familiar to most information systems professionals. The team's mission is to demonstrate the capability of the major CASE/4GL environments to deliver complete and complex

business solutions under "live fire" conditions. In this issue, we look at Cincom Systems, Inc.'s development tools, centered around Mantis and Supra, which also interface with the Information Engineering Workbench (IEW) CASE tool developed by Knowledgeware, Inc.

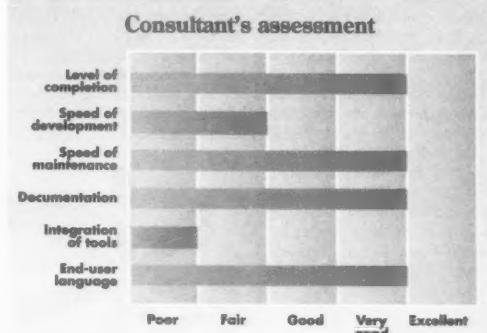
Carried out by Cincom in the UK, the solution to the benchmark fell short in one small detail. One function would not have passed normal QA tests, although it was formally correct. Despite this shortcoming, the level of completion was rated "very good."

The team of three specialists completed the benchmark in almost 72 hours — a time well in excess of some previous solutions. Some of the extra time had to be attributed to using SQL. Further time was lost because of a bug in Mantis, which rendered the SQL database inaccessible for a while. Thus, speed of development was "fair."

opment was "fair."

The maintenance effort of 11 hours was much more favorable. The modular development enforced by the composition feature certainly contributed to the efficiency of the development team. The speed of maintenance was rated "very good."

The documentation was another strong feature of the Cincom environment. An overview is provided by the graphic presentation of the IEW CASE tool at the design level combined with the bill-of-materials listing of the im-



plementation. We rated documentation "very good."

Using the third-party IEW made integrating the tool kit difficult. Because an IEW and Mantis interface was completed just at the beginning of this year, the bridge between these two environments is still patchy, with Mantis' and Supra's specific parameters passed as IEW comments to generate code [containing syntax errors]. The integration of the Cincom development tools Mantis and Easy is also not complete. Therefore, the integration of the CASE tool was "poor."

The Easy end-user query lan-

guage handled the simple inquiries but required some programmer experience when handling time data or when specific data views had to be defined in addition to the existing ones. We regarded it as "very good."

In conclusion, Cincom's benchmark had mixed results. Integration of the IEW is at an early stage. At the implementation level, repetitive detail work is required of the developer, with no support in some basic functions. But the maintenance of software development is well supported, which allows the composition of individual program functions and effective documentation.

Development and maintenance report card

Performance is graded from A (excellent) to F (poor).

ANALYSIS AND DESIGN: B

The design component of the IEW was used to derive the data model and to define some program logic in a short time. Any refinements made later, however, could not be fed into the IEW environment. Compound data keys were not supported.

Strength: It has a proven design environment with good graphics.

Weakness: It is restricted to a one-way process in a single-user PC environment.

DATABASE SETUP: C

Using a Cincom-developed CASE Interchange file, the Supra SQL database was generated almost instantly. The data structure, however, had syntax errors that had to be fixed manually.

Strength: It can generate data from CASE design.

Weakness: The generated database may not be syntactically correct.

FILE MAINTENANCE TRANSACTIONS: C

This step took longer than expected. The delay was primarily because of limitations in the SQL

templates, which could not provide generalized functionality. As a result, a lot of detail code had to be specified explicitly, much of which was repetitive.

Strength: Many design specifications can be used directly.

Weakness: Not much assistance is provided to design logic details.

COMPLEX TRANSACTIONS: D

Time was lost when a Mantis problem made the database inaccessible. More difficulties were encountered with time values.

The final solution was correct but clumsy to work with.

Strength: Complex transactions can be composed from elementary functions.

Weakness: Time conversions and complex screen layouts are cumbersome.

INQUIRIES: B

Using the query language Easy, the job was done without much difficulty. Again, some effort was required for time conversions.

Strength: The standard inquiries can be done by non-IS staff.

Weakness: Solutions with

major alterations were required to transform the on-line processing logic to meet the requirements of the batch interface function.

COMPLEX REPORTS: B

This section required Mantis for a solution. The task was completed in a short time and in full compliance with requirements.

Strength: Mantis can cater to complex reporting.

Weakness: A lot of detail work is required by the programmer.

INTERFACE: B

The Ashton-Tate Corp. Dbase file was exported as an ASCII file, which was read by Mantis without any difficulty. The program logic of the complex transaction step was reused, but ma-

ior alterations were required to transform the on-line processing logic to meet the requirements of the batch interface function.

Strength: Mantis can access PC data.

Weakness: Batch reporting is not well supported.

ENHANCEMENT: B

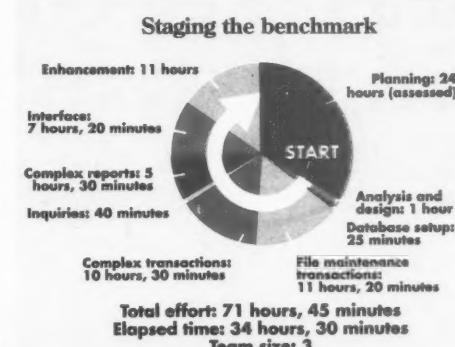
The team opted to add a further field to an existing file rather than add a further file, which would have given a more general solution. With the help of the bill-of-materials program lists, the necessary changes were incorporated without delay.

Strength: It has good overall documentation facilities.

Weakness: Only a short-term solution is provided.

The solution was developed on the Cincom data center in Cincinnati, which consists of a cluster of IBM 3080 series mainframes offering the MVS operating environment. The computer facilities were accessed from Maidenhead UK via the Cincom Netmaster system, which supported several hundred concurrent users worldwide.

Details of the products are available from Cincom Systems, Inc., 2300 Montana Ave., Cincinnati, Ohio 45211, (800) 888-0115.



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Systems

FROM PAGE 29

purpose hardware," he told a recent gathering of venture capitalists. "It was a painful transition, but a necessary one. We have to provide tools for the real world."

About a dozen expert systems software houses are targeting the corporate IS world. These include Bell Atlantic Knowledge Systems, Inc. in Philadelphia; Aion Corp. in Palo Alto, Calif.; Neuron Data, Inc. in Palo Alto; AI Corp. in Waltham, Mass.; Infrence Corp. in Los Angeles; Gensym Corp. in Cambridge, Mass.; Information Builders, Inc. in New York; and MDBS, Inc. in Lafayette, Ind.

The technology at the base of these products is an expert system shell. This provides a development environment for IS staffs to design applications that use knowledge gleaned from humans and put into a computer. At the heart of the shell is a knowledge-representation model and search routines.

Usage varies

Specific implementations of the reasoning engine and other particulars do, of course, vary. What most of the products do have in common is that they run across a range of systems, from IBM mainframes and DEC minicomputers to Unix-based workstations and personal computers running DOS or OS/2.

If the products do not yet support all these platforms, the vendors have promised that they will.

Many of the shells also support commercial graphical user interfaces, including Motif, Decwindows, Microsoft Corp.'s Windows and others.

Some vendors also provide supporting tools for forms design and debugging, for example, as well as developer libraries. Also, scaled-down versions of the full environments are available to build smaller expert systems applications, like Guru First Step from MDBS. In October, Aion will ship Path Builder and Checklist Builder, tools to help end users design expert systems.

The products also have hooks into most of the popular database management systems on the market, including Oracle, DB2 and others. However, there are differences in how the tools implement these hooks, warns Avron Barr, president of Aldo Ventures, Inc., a Palo Alto consulting firm.

"Some allow you to send a query to a database and pull the information out," he said. "But that's quite a different thing than building an environment that allows you to describe where the information is and then have the application use that information in an integrated fashion."

HARD BITS

Quotron, DEC offer exchange system

Quotron System, Inc. and Digital Equipment Corp. will offer Quotron's new F/X Trader electronic foreign exchange dealing system to more than 40 banks worldwide, the companies recently announced. Quotron, a leading provider of financial in-

formation services, will rely on DEC for site preparation, hardware and software installation and support. F/X Trader is an information and trading system that allows traders to negotiate transactions from their IBM Personal System/2 Model 70

workstations connected through DEC's Decnet software and Decsystem 3100 servers to access a global interbank network.

DEC has rolled out a disaster recovery service that includes reselling Chicago-based CHI-

COR Information Systems, Inc.'s Total Recovery Planning System coupled with new emergency services and hot-site centers for users. New services from DEC include 11 business recovery centers throughout the U.S. and a Chicago-based hot site with a backup computer facility, the company said. Prices for the IBM PC-based software range from \$9,500 to \$50,000.



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Unitech updates security software

In an effort to give Unix users more security options for their systems, Unitech Software, Inc., a Unix-based systems software vendor based in Reston, Va., last week introduced Version 3.0 of its Usecure security software product.

The new version includes an

enhancement that the company dubbed Upass, a Unix password management and control module designed to implement the U.S. Department of Defense guidelines for security password management, a Unitech spokesman said.

Upass features include the

ability to store passwords as one-way encrypted data, so that the passwords cannot be viewed through the database.

Upass also provides automated password and log-in audit trail reporting, which allows the systems administrator to view any attempts to penetrate the sys-

tem in real time and supports access by the systems administrator to individual user security profiles.

An on-line Help system is designed to aid users in setting up or changing their own passwords.

The package also gives administrators the ability to set up "super user" access, giving that user access to all files under all

passwords, according to the spokesman.

Upass can run under several different Unix-based systems, including those of Sun Microsystems, Inc., Digital Equipment Corp., Hewlett-Packard Co., Unisys Corp., NCR Corp. and others.

In beta testing now, Unitech's Upass enhancement will cost from \$1,000 to \$4,000. The company said the new version will be available soon.

MAURA J. HARRINGTON

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Anthes

FROM PAGE 29

shoved aside by the electronic calculator. Early models were made of ivory and were called Napier's bones, after the Scottish mathematician who invented logarithms, on which the devices are based.

Seymour Cray, the patriarch of supercomputing, once said he had a "social problem" as a graduate student at the University of Minnesota because he had a circular slide rule while nearly everyone else had the straight-stick kind. But Seymour was not daunted; in his first job, he used the rule to help design what was to become the Univac 1101 mainframe.

Now, 40 years later, Cray uses a Macintosh personal computer to help him design the next generation of supercomputer, a machine whose gallium arsenide logic chips will give it a theoretical peak speed of 16 billion flops (gigaflops), or 6 times faster than today's fastest Cray computer.

The economics of all this are rather daunting. We can assume that Napier spent a few scant pounds on slide rule development, and the device lasted for some 300 years. Now, by one estimate, Cray Computer will spend more than \$300 million bringing the Cray-3 to market. And that machine is likely to survive competitive onslaughts for a few short years, at best.

Actually, the slide rule doesn't do floating-point operations. It just finds a few significant digits, leaving the placement of the decimal point to "wetware" — what the scientists among us call the user's brain.

No one really knows how fast that is, but one estimate says the brain computes at 10 trillion operations per second. (The brains of people like Napier and Cray presumably do a bit better than that.)

At 10 teraops, the brain is faster than today's best supers by a factor of 10,000. Not bad for a device that uses neither superconductivity nor gallium arsenide.

Anthes is *Computerworld's* Washington, D.C., correspondent.

Apparel maker moves to Wang systems

ON SITE

BY SALLY CUSACK
CW STAFF

COLFAX, La. — When Ditto Apparel of California, Inc., replaced two aging IBM System/34s with three Wang Laboratories, Inc. VS 5000 computers last January, it ushered in a different generation of automation for its piecework inventory process.

According to Cecil Holden, Ditto's controller, the VS 5000 will generate a bar-coded ticket that will be issued to individual

pieceworkers — employees who get paid on a per-piece, per-day basis. Within the apparel industry, the term "piece goods" refers to the material itself, while "goods and trim inventory" denotes buttons, ribbons, zippers and other accoutrements.

The piecework payroll was previously done manually by payroll clerks, Holden said, with the number of pieces multiplied by the pay rate to calculate the individual's earnings for the day. The final numbers were then keypunched into the System/34.

"What we're doing is upgrading the

software to generate bar codes that will capture payroll calculations on a daily basis," Holden said. "The payroll clerk will be able to read the bar code data via the VS 5000, and all other production cycle information will reside on the system as well." The systems also are used to automate production control, raw materials inventory and costing system functions.

The apparel maker is the U.S. manufacturing arm of Jordache, Inc., the New York-based clothing and design company widely recognized for its label on blue jeans. Ditto has four plants in Louisiana and one in Texas. With a total of 1,800

pieceworkers on its payroll and shipments of \$65 million last year, Ditto wanted to maintain better control of its manufacturing process by moving to an automated production planning system.

Ditto has plans to link three of the sites — the Colfax headquarters, another Louisiana plant and the Texas facility — together for a more streamlined approach to data collection and analysis. Four sites in Louisiana and one facility in Texas are currently running Wang equipment, connected via 9.6K bit/sec. leased lines.

The company conducted an in-house analysis earlier this year and contracted Coopers & Lybrand to help with the study. "We needed an objective third-party view," Holden said. "The software really drove the hardware purchase. We decided we needed a good, integrated management and manufacturing planning package to meet our needs specific to the apparel business."

The criteria included a product that could control all aspects of inventory from the raw material purchase to the finished product, and Holden and his staff evaluated 30 various software packages before deciding on the AIC Apparel Production system, a package from Centennial Computer Services, Inc., an Atlanta-based software house and an authorized Wang value-added reseller.

The AIC package was written by Advanced Intelligence Corp. in Los Angeles and provides applications for sewn-goods manufacturing and importing, accounting, warehousing and shipping, as well as shop floor control and factory management.

The decision to use the Wang equipment was based on price/performance considerations, and while the payroll portion of the software runs across multiple platforms, the inventory and costing programs are based on Wang systems.

Somewhere in the middle
Holden noted that Wang was not the "highest priced bidder, but it wasn't the lowest, either." He indicated that the company invested about \$500,000 into the system and said he feels the cost will be justified in reduced personnel requirements in payroll handling. "It will also give us a quicker, better response time for customer inquiries," he said.

In addition, Holden said that the vendor's ability to service the machines was taken into consideration. Colfax is located in the middle of the state, 4½ hours from New Orleans and two hours from Freeport, where the nearest major airport is located.

The response to date? So far, so good. "We had Wang out for the installation, and other than one or two calls generated by people operating the system, that was it," Holden said. The company has apparently encountered no problems with the hardware itself, and the software has required only a few minor adjustments. Ditto plans to put all production cycle data on the Wang machines.

The company also has plans to install a Wang imaging system this fall to orchestrate and implement the division's design and illustration needs. These are typically specification sheet items, such as pants and a shirt, that could be visually depicted in an on-line environment prior to full production to correct errors or miscalculations.

And the IBM System/34s? "I guess we're gonna try and sell 'em," Holden said. "Got any ideas?"

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NEW PRODUCTS — SOFTWARE

System software

Software Pursuits, Inc. has announced VM/XRM, a VM extended real memory product that enables users of VSE guest machines running under VM/SP to use more than 16M bytes of memory without having to use VM/HPO or VM/XA.

The product includes Software Pursuits' VSE/XRM and MVT/XRM products, both of which provide up to 64M bytes of memory.

Pricing for perpetual licenses ranges from \$25,000 to \$42,000, depending on CPU size.

Software Pursuits
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Alameda, Calif. 94501
(415) 769-4900

Database management systems

Automated Technology Associates has announced Atabase Revision 4.2, a real-time, entity-relation database for operations-driven applications.

Client/server software enables users to perform distributed database applications processing, and a report generator allows users to make database queries and

access information by using standard SQL commands, the company said.

The product is available for the Hewlett-Packard Co. HP 9000, 800 and 300 series of minicomputers and Digital Equipment Corp. VAX systems.

Pricing ranges from \$7,500 to \$22,500, depending on CPU size.

Automated Technology
9000 Keystone Crossing
Indianapolis, Ind. 46240
(317) 573-9000

Allen Systems Group, Inc. has announced Release 4.0 of Fast/Access, a tool that reduces the time needed to perform I/O on a Computer Associates International, Inc. IDMS database.

The product operates under MVS/SP,

MVS/XA and MVS/ESA and can be applied at job, job-step or file levels. It can be installed in less than one hour without requiring an IPL or any changes to application code, the vendor said.

Perpetual license fees range from \$14,600 to \$95,000, depending on CPU size and type of group.

Allen Systems
750 11th St. S.
Naples, Fla. 33940
(813) 263-6700

Development tools

XA Systems Corp. has added a data file compare facility to Data-Expert, a data manipulation tool used for testing and maintenance of IBM mainframe-based applications.

The new feature enables programmers to compare data sets of any file organization against any other, including IBM's VSAM or Sequential. Cobol or PL/I record layouts are used to help users define selection and comparison criteria for two data files.

The product is available for \$42,000.

XA Systems
983 University Ave.
Los Gatos, Calif. 95030
(408) 395-1800

Telesoft has announced two Ada software tools designed to facilitate embedded systems development.

Tele-Ada Link and Tele-Ada Kit work in conjunction with the Telegen 2 Ada Development System to enable programmers to produce code on Sun Microsystems, Inc. systems or Digital Equipment Corp. VAX hosts.

Tele-Ada Link costs between \$2,500 and \$20,500, and Tele-Ada Kit is priced between \$8,000 and \$64,600. Pricing is based on system configuration.

Telesoft
5959 Cornerstone West
San Diego, Calif. 92121
(619) 457-2700

Magec Software has introduced Release 2.3 of its automated Cobol development system.

The Magec Integrated Systems Environment has been enhanced with domain definitions. Domains are global data definition models that assist data administrators in standardizing definitions of various types of data.

Magec supports IBM and compatible mainframes operating under MVS, VSE and VM/CMS with CICS and other database management systems. Pricing ranges from \$1,000 to \$200,000, depending on CPU and type of operating system used.

Magec Software
P.O. Box 260319
Plano, Texas 75026
(800) 336-2432

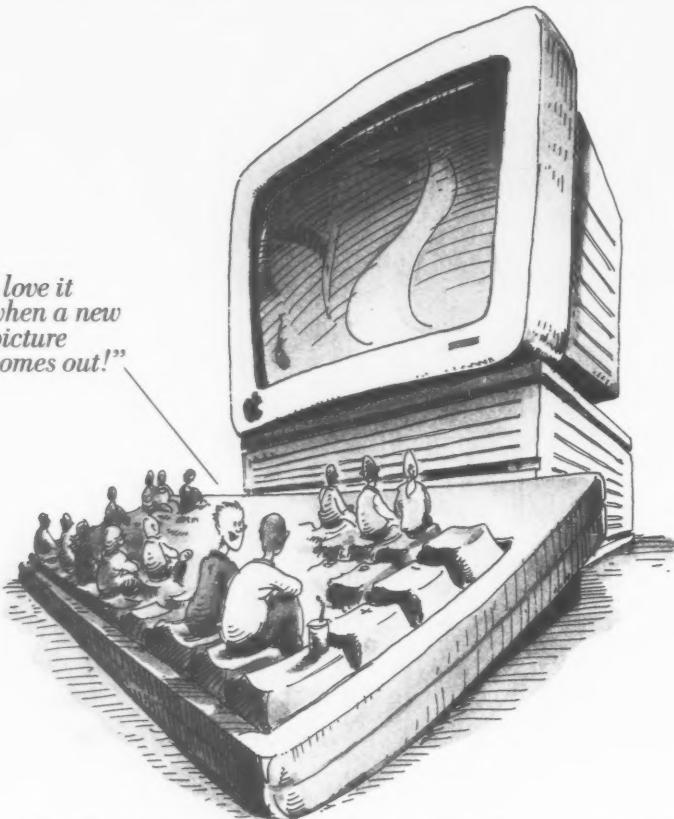
Applications packages

Systems Union, Inc. has announced Sun-Accum Version 3.4 of its international financial management software package designed for North American corporations with overseas offices.

The product runs on single-user, multiuser and networked environments, including personal computers, PC-based local-area networks, Digital Equipment Corp. VAXs and Unix-based systems. It includes features for handling the Federal

Continued on page 44

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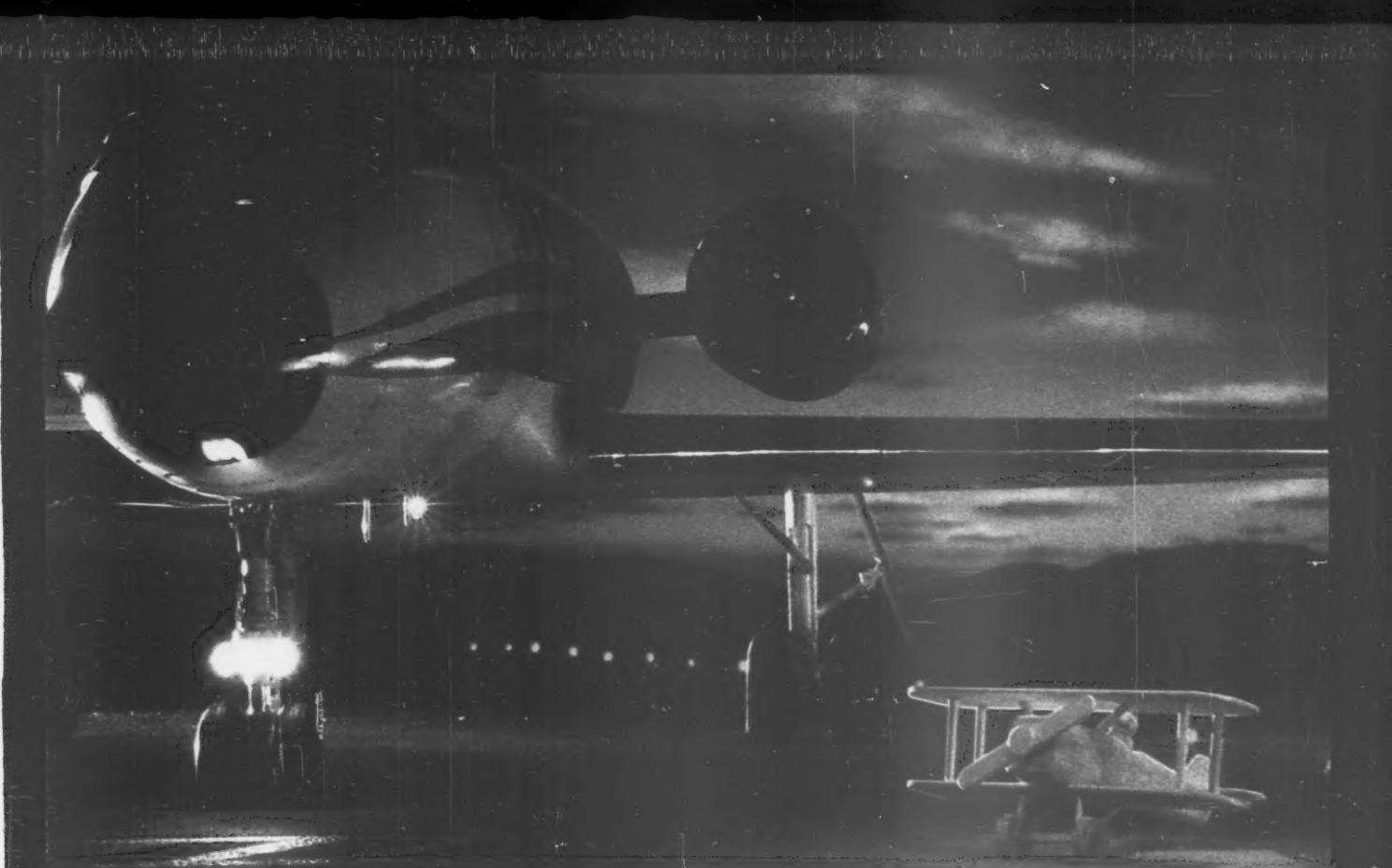
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Continued from page 42

Accounting Standards Board's 52 and 89 accounting requirements.

Prices for site licenses range from \$3,500 to \$100,000, depending on CPU size, type of operating system and number of users.

Systems Union
244 E. 48th St.
New York, N.Y. 10017
(212) 753-7777

Access Technology, Inc. has announced Release 2.1 of its Vivid Presentation Graphics software package for Digital Equipment Corp. VAX/VMS computers.

The package includes an extensive business-oriented clip-art library of more than 50 images and complete support for color Postscript printing devices. The latter feature enables users to preview color output to printing devices in what-you-see-is-what-you-get formats.

Prices range from \$800 for a Vaxstation version to \$20,000 for a VAX 8000 version. An additional clip-art package containing 540 images per series costs \$150 for Vaxstations and \$850 for VAX 8000 machines.

Access Technology
2 Natick Executive Park
Natick, Mass. 01760
(508) 655-9191

The SAS Institute, Inc. has announced plans to allow users of Digital Equipment Corp.'s All-In-1 to be linked with its SAS Applications System.

The connection enables users of any DEC VAX to run applications based on Version 6.0 of SAS under DEC's VMS operating system while remaining in the All-In-1 environment. First-year annual license fees range from \$1,900 to \$15,700, depending on CPU size.

SAS Institute
P.O. Box 8000
SAS Circle
Cary, N.C. 27512
(919) 677-8000

Software Engineering of America, Inc. has announced Release 3.2 of its Operator Dynamic Dialog Subsystem, an enhanced version of its rules-based system designed to facilitate operations console message management in IBM MVS environments.

Release 3.2 includes VTAM applications and data set allocation monitoring, compatibility with IBM's TSO REXX and TSO CLIST calls and the ability to read and write records in user-defined data sets.

The product is priced from \$14,700 to \$24,500.

Software Engineering of America
2001 Marcus Ave.
Lake Success, N.Y. 11042
(516) 328-7000

Unisys Corp. has announced features that will be included with Release 90.01 of its PALS Library Management System, which is scheduled to be available in the first quarter of 1991.

An authority control module will provide users with on-line access to machine-readable catalogue (Marc) authority records and automated authority checking. A Marc editor lets users download, correct and upload PALS database records, the company said.

The product runs on Unisys' 1100 and 2200 series mainframe systems. Prices range from \$12,000 to \$22,000, depending on type of platform.

Unisys
P.O. Box 500
Blue Bell, Pa. 19424
(215) 986-2243

PDS, Inc. has added a version of its Human Resource Manager to its Financial Software and Personnel/Payroll system.

The system was designed to operate on IBM Application System/400 machines. It can be installed as a complete payroll, personnel and benefits system, or any of the three modules may be used independently, the vendor said.

Prices range from \$30,000 to \$75,000, depending on CPU and size of employee database.

PDS
Meetinghouse Business Center
2240 Butler Pike
Plymouth Meeting, Pa. 19462
(215) 828-4294

Keyword Office Technologies Ltd. has announced a document interchange software application package designed for Unix systems.

Keypak (Unix) allows revisable document exchange and information sharing

among users of different Unix-based systems, document editors, electronic mail systems or workstations.

The product is packaged in three configurations: Base, Wppak and Cwppak. Workstation license fees range from \$300 to \$1,500. System licenses cost between \$300 and \$13,000. Prices depend on configuration and type of license.

Keyword Office Technologies
2816 11th St. N.E.
Calgary, Alta., Canada T2E 7S7
(403) 250-1770

DynaSoft Corp. has announced Version 4.0 of Dynaplan, its spreadsheet software package that supports IBM MVS and VM operating systems. It features prefix commands that facilitate the changing of spreadsheet fields. It also enables multiple graphs to appear on a single screen.

Prices range from \$4,000 to \$35,000, depending on CPU size.

DynaSoft
6300 N. River Road
Rosemont, Ill. 60018
(708) 696-4440**NEW PRODUCTS — SYSTEMS****I/O devices**

Cyberchron Corp. has announced 16- and 19-in. color monitors designed for use in adverse environmental conditions.

The CRM-16 and CRM-19 feature screens with 1,280- by 1,024-pixel resolution and a wide-bandwidth video amplifier that delivers fine-grain video images.

Prices for both models range from \$7,000 to \$10,000, depending on quantity and number of options purchased.

Cyberchron
P.O. Box 160
U.S. Route 9
Cold Spring, N.Y. 10516
(914) 265-3700

Precision Image Corp. has introduced two monochrome electrostatic plotters that feature a drive system designed to provide accuracy of .005%.

The M124 D-size plotter, which costs \$29,900, and the M136 E-size, which costs \$33,900, incorporate a proprietary drum-based technology that holds material tightly in place with a vacuum seal to prevent shrinkage and stretching caused by humidity or tension variations, the vendor said.

The plotters can be operated from any mainframe, minicomputer or microcomputer equipped with standard hardware and software.

Precision Image
501 Chesapeake Drive
Redwood City, Calif. 94063
(415) 366-8900

Visual Technology, Inc. has introduced an X Window System-based gray-scale display station designed for office automation and manufacturing environments.

The Visual X-15 Turbo X Display Station includes a 20-MHz Motorola, Inc. MC68020 processor, 2M bytes of dynamic random-access memory and a 15-in. landscape display that features 1,152- by 900-pixel resolution at a 70Hz refresh rate.

The product is available 30 days after receipt of order. Prices begin at \$2,975 for a unit with 2M bytes of RAM and a gray-scale monitor.

Visual Technology
120 Flanders Road
Westboro, Mass. 01581
(508) 836-4400

Laser Design, Inc. has introduced Data-sculpt, a three-dimensional scan data editing software package designed for use with its Surveyor laser digitizing systems and other computer-aided design and manufacturing (CAD/CAM) environments.

The product enables users to graphically manipulate coordinate-scan data of

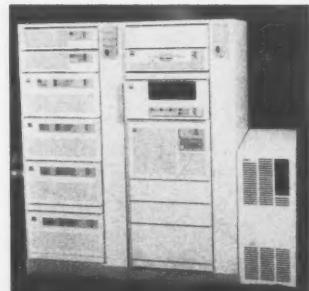
models for CAD/CAM applications. It can be used on IBM systems equipped with an Intel Corp. 80386 processor or Unix-based Silicon Graphics, Inc. workstations. The system is priced at \$9,500.

Laser Design
9401 James Ave. S.
Minneapolis, Minn. 55431
(612) 884-9648**Power supplies**

Clary Corp. has announced an on-line 5-kVA uninterruptible power supply designed for IBM Application System/400 machines.

The Onguard Series 40D provides eight to 25 minutes of on-line, sine wave power for up to three racks of an AS/400. Its RS-232 interface reportedly ensures automatic shutdowns during utility failures. The product also sustains power during extended brownouts while saving battery backup for the file server in case of a blackout, the vendor said.

The Onguard Series 40D is priced at \$10,950.

Clary Corp.
320 W. Clary Ave.
San Gabriel, Calif. 91776
(818) 287-6111**Clary's Onguard** provides emergency power for an AS/400

Liebert Corp. has announced a line of uninterruptible power supplies (UPS) that are designed for use with midrange systems.

The Series 300 UPS provides continuous power to midrange computers such as IBM's Application System/400, telecommunications equipment and other sensitive electronic devices, according to the company.

The products are available in 10- to 125-kVA models. Prices range from \$17,500 to \$51,700, depending on kVA capacity.

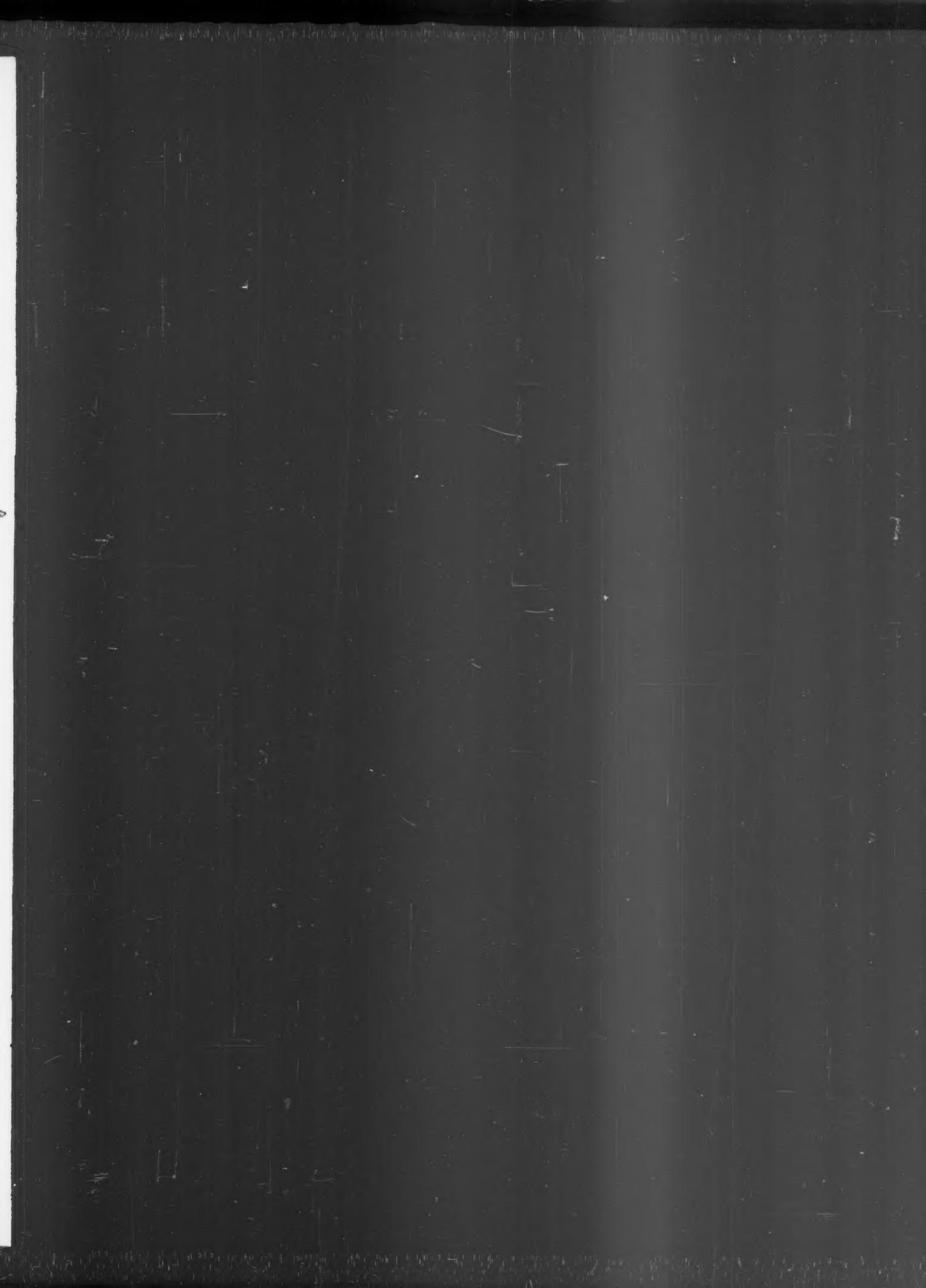
Liebert
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1050 Dearborn Drive
Columbus, Ohio 43229
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IDC WHITE PAPER

*Image
Management Systems*

IMAGE MANAGEMENT SYSTEMS

EXECUTIVE SUMMARY

With corporate icons such as American Express Co., Citicorp and Federal Express Corp. realizing savings of 20% and more through the use of image management systems, widespread use of the technology seems likely to occur in the near future.

While some of the best known applications include processing checks and credit card receipts, image systems are also specifically designed for engineering drawings, mapping systems and general business forms. They coexist with other complementary technologies such as optical character recognition (OCR), microform - microfiche and microfilm - and electronic data interchange.

Dating back to the late '60s, image management systems were originally designed to make paper documents available for on-line display and retrieval. As the systems evolved, however, that philosophy gave way to the currently accepted concept of automating the entire paper handling process.

Beginning with Wang's entry in 1987, the major systems vendors started rapidly lining up behind image systems. Unisys Corp., IBM, Digital Equipment Corp., Hewlett Packard Co. and NCR Corp. have joined this segment of the market. Another company, FileNet Corp., played a pioneering role in developing turnkey image systems.

The third party market has also blossomed. These vendors can customize basic systems for a particular application, concentrate on one part of the system, such as OCR, or provide the components of the system platform. This flexibility has attracted the attention of the major systems vendors, many of whom have signed deals with multiple third party firms.

Image systems will continue to stimulate the development of computer technology as they force users to upgrade their management systems.

IDC stresses the competitive advantages to be gained from image management system implementation and urges users to investigate their promise and invest in their use.

IMAGE MANAGEMENT SYSTEMS

AN IDC WHITE PAPER FOR INFORMATION SYSTEMS MANAGEMENT

INTRODUCTION: WHAT IMAGE MANAGEMENT SYSTEMS CAN DO FOR YOU

HOW IMAGE SYSTEMS WORK

Scanners
Indexing
System Performance

A BRIEF HISTORY OF THE IMAGE MANAGEMENT SYSTEMS INDUSTRY

Microform Moves Aside
The Software Evolution

TYPES OF IMAGE SYSTEMS

General Business Systems
Item Processing Systems
Engineering Drawing Systems
Mapping Systems

COMPLEMENTARY TECHNOLOGIES

Optical Character Recognition
Microform
Electronic Data Interchange

VALUE, FUNCTIONS AND BENEFITS OF IMAGING

Why are Image Systems Strategic?
High-Value Applications
The American Express Paradigm
Key Functions and Benefits
Digitizing Documents at the Earliest Possible Point
Electronic Routing
Digitization
Reducing Data Entry Errors
Facilitating Business System Redesign
Reducing Physical Storage Space
Reducing Document Retrieval Time
Improving Document and System Security
Improving Management and Government Report Capabilities
Providing a Productivity Measuring Tool
Eliminating "Knowledge-based Downtime"

THE SYSTEMS VENDORS

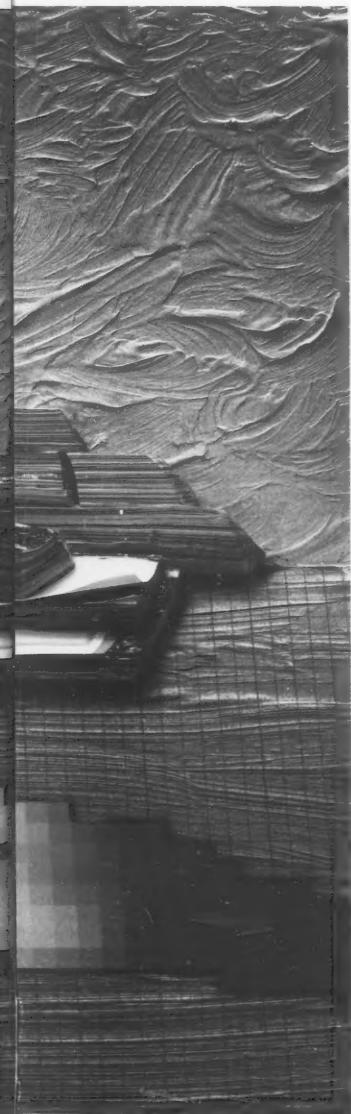
THE ROLE OF THIRD PARTIES

A USER'S GUIDE TO THE MOST COMMON MISTAKES

TRENDS AND ISSUES

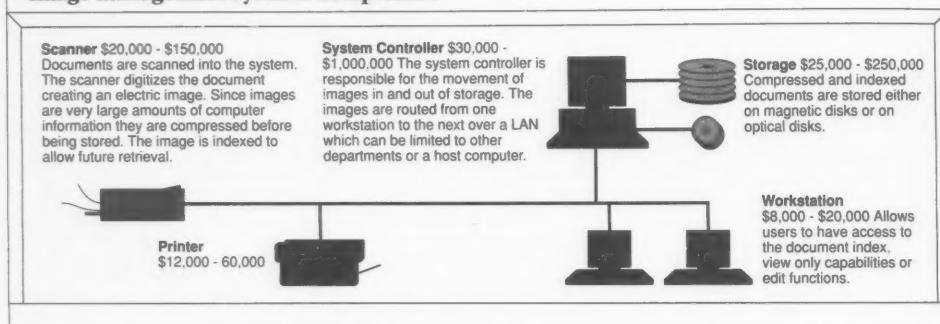
Standards
Future Technological Developments





THE GREAT TECHNOLOGICAL QUEST FOR THE
MYTHICAL PAPERLESS OFFICE MAY FINALLY BE
LAID TO REST. IMAGE MANAGEMENT SYSTEMS
HAVE COME NOT TO SLAY THE PAPER BEAST BUT
TO TAME IT. ALLIED
WITH ON-LINE TRANS-
ACTION PROCESSING,
RECORD MANAGE-
MENT AND OTHER
OFFICE SYSTEM TECH-
NOLOGIES, IMAGING
WILL IRREVERSIBLY
CHANGE THE NATURE OF THE WHITE-COLLAR
WORKPLACE. ■ TO DATE, IMAGE SYSTEMS HAVE
DELIVERED PRODUCTIVITY GAINS EXCEEDING 20%
AND PROVIDED SIGNIFICANT COMPETITIVE
ADVANTAGES TO COMPANIES SUCH AS AMERICAN
EXPRESS CO., CITICORP, FEDERAL EXPRESS CORP.
AND CONSOLIDATED FREIGHT. ■ IMAGE
MANAGEMENT SYSTEMS AND IMAGE PRO-

Image management systems components



A typical image management system may range in price from \$95,000 to \$1,285,060 depending on configuration.

cessing are the two most common terms used to describe a system that allows users to digitize a business document and move the image of that document from one workstation to the next for more effective processing. This technology is easy to use but requires careful planning if its potential is to be fully realized. This paper will show how users who implement their systems wisely reap the many benefits they offer.

And those benefits are extensive. They range from reducing data entry errors, to streamlining information flows within organizations, to reducing physical storage space. In the digital world of image management systems, users can greatly increase the speed and efficiency of processing a wide variety of documents, including checks, credit card statements and insurance policies, to name but a few.

Just as there is a wealth of applications, there is also a variety of systems that run them. Although general business documents like job applications and item processing documents like checks come to mind first, there are also systems dedicated to engineering drawings and mapping applications. The common thread that links them is their ability to allow people to work faster and better.

Like so many computer-based technologies, image management systems date back to the mid-1960s. Those early systems gave way to more modern analog systems in 1978 and their digital successors debuted in 1982. Now major systems vendors and third party firms are combining their skills to offer the most advanced products—products that can have a direct impact on the tens of billions of dollars businesses spend on paper-based systems every year.

Although the worldwide market for

image management systems has been slow to grow, IDC predicts it will reach \$25 to \$35 billion by the late 90s. By that time, the need for data entry, which is arduous and error-prone, will have diminished dramatically.

There are two prominent misconceptions about image management systems. The first is that they portend the end of paper-based offices. This is not the case. What they offer is a more streamlined work flow for paper-based offices. The second misconception is that image management technology is the same as optical disk technology. This is also wrong. Optical disk technology is an enabling storage technology for image management systems and as such only a subset.

This discussion of image management systems provides the reader with an understanding of how image management systems work, their history, the various types of systems and high-value applications. It also describes system functions and benefits, the roles of vendors, the most common user mistakes, standards and future technological developments.

HOW IMAGE SYSTEMS WORK

In terms of hardware, an image management system is normally composed of a combination of scanners, workstations, servers, storage and printers in a network. Basic software includes a database management system for image indexing and software to run each of the hardware components. Depending upon the specific application requirements, some vendors also offer a microfilm camera and microfilm storage as an option.

In a typical system, a general business document is fed into the scanner much in

the same way documents are used with copier and facsimile machines. The scanner then reduces the document to a series of 1s—commonly referred to as on-bits—to a dark area of the document or 0s—to a white portion of the document.

As a result, the image appears to the computer as an unintelligible series of bits. The computer can't search for a specific word or phrase since the document is an image as opposed to a text file. Therefore, to retrieve the image, users have to assign specific index information, either manually or automatically, so the computer can identify it.

A data compression process ignores white space between letters and stores the dots comprising them. Depending on the compression technique used, this reduces the number of bits stored to a range from 15-to-1 to 50-to-1. Despite the use of advanced compression techniques, a bit-mapped image can consume 500K bytes or more. As a result, image management system users frequently require very large amounts of computer storage, storage which can be relatively economical when based on optical disk. Magnetic disk storage costs \$8 per megabyte, while optical-disk storage costs only \$1 per megabyte.

If users want to retrieve a document, they enter index information into their workstations. The workstations send that information to a database management server, which in turn relays the request to the storage portion of the system. When the request is fulfilled, the images are sent back over the network to the user workstation. Finally, the image of the document is decompressed before it is displayed on the workstation screen.

IMAGE MANAGEMENT SYSTEMS

Scanners

There is a broad range of scanners to meet the demand for multiple applications. They offer varying rates of resolution. The resolution of a scanner is the clarity or level of definition provided for the scanned image. This is generally defined as dots per inch; each dot is called a pixel. The majority of scanners use 200-, 240- or 300 dot/in. In order to increase resolution, scanning time, image size and required storage must also be increased. The amount of processing power required to decompress and compress the image also grows.

The major vendors selling the scanners do not usually manufacture them. As a result, many scanner interfaces are incompatible with their counterparts from other companies. This means vendors must write specific software drivers for almost every scanner they support. Because this is time-consuming and expensive, vendors limit the number of scanners they support.

Of all the components in a system, scanners have the highest rate of failure. IDC recommends that users have a backup scanner available at all times. Users should also specify in the purchase contract the time in hours it will take the vendor to repair the original or install the backup.

Indexing

Indexing is critical to image management systems and one of their biggest benefits. In paper-based systems, indexing is generally limited to one field, e.g., the notation tab of a file folder. Image management systems are more flexible, allowing multiple methods of retrieval, e.g., by name, account number, date of application, etc. Each additional index field offers another way to access a document. However, this increased accessibility also increases the amount of manual keying required to enter the document into the system. Further, more index fields add to the total index size, increasing general system overhead.

System Performance

Although, as mentioned, a scanned image may range in size up to 500K bytes or more, conventional computer architectures are designed to handle 4K bytes and smaller blocks of data. This inconsistency has made it very difficult to blend display technology, workstations, networks, DBMSs and storage in an eloquent form, and has slowed product development.

Image management system performance is difficult to assess on a general basis. Because there are many individual factors that affect performance, it should

only be judged on an application-by-application basis.

A BRIEF HISTORY OF THE IMAGE MANAGEMENT SYSTEMS INDUSTRY

The image management systems industry was initially pioneered by system integrators such as Litton Integrated Automation and TRW Financial Systems. All the early market factors created an ideal environment for systems integrators. The technology was strategic for many large U.S. corporations, the applications were unique from one industry to the next, the technology was generally unavailable and system requirements were substantially different from one company to the next.

During the late '70s and early '80s, the integrators managed to install relatively dramatic demonstrations of the technology at companies such as Federal Express, Emery Air Freight and Boeing. The focus of the integrators was on basic hardware and software capabilities for scanning images, displaying them effectively and integrating leading-edge components. These early systems were designed to make "paper" documents available for on-line display and retrieval, as opposed to automating the entire paper process.

Meanwhile, the traditional vendors of microfilm products such as Eastman Kodak, Bell & Howell and 3M feared that as the price of storage fell, many companies would bypass microfilm and elect to store their records on a more accessible on-line medium such as optical disk. It was from this defensive posture that all three companies began investing substantial resources in developing image systems—systems that largely mimicked their existing products but replaced microfilm and microfiche with optical disk technology.

Microform Moves Aside

This represented an historic transition, as microfilm and microfiche—together known as microform—had been time-tested and economical archival methods for more than 25 years.

The vital point is, once a document has reached the records management area, all active processing has already been accomplished. Records management exists because legal or business requirements demand some documents be maintained for extensive periods of time, e.g., 30 years for a typical mortgage. Some government records must be saved for as long as 100 years. Retrieval rates vary depending on the type of application. Microfilm is the least expensive storage medium for central repositories of documents that have com-

pleted the processing cycle and are not likely to be retrieved soon or often.

The first company to realize just how far-reaching document processing technology could be was formed in the early '80s. FileNet Corp. introduced the first turnkey image management system in 1984, a system that featured optical disk storage with gigabyte capacity. It followed up with a workflow software package. The optical disk storage was a new way to digitize business information—95% of which still exists on paper despite the advancements of the computer age and office automation. But, FileNet said at the time, paper was still the most appropriate storage medium for the vast majority of information. It felt the best way to process that paper was with workflow software, which automatically moves data from one processing step to the next.

The Software Evolution

Today, work-in-progress software has built on the base of workflow software and become a key element in image management systems. This software is designed to automatically reactivate processing when previously missing information becomes available.

As a current example, a major U.S. oil company spent several months reviewing its accounts payable application and determined that adding image capabilities would produce tremendous savings in data entry, ease of access to original documents and increased specialization in processing accounts.

At that time, the average cost of processing a transaction, including all hardware and software, was less than \$20. This was in an environment where necessary documentation was not always available for processing. This meant the process frequently bogged down while additional documentation needed to complete the transaction was located.

The cost of processing these transactions with missing documents was almost eight times higher than a straightforward transaction. A simple calculation revealed that almost 60% of the oil company's accounting department costs were contained in the management of these accounts. Simply put, the cost of work in progress was killing them. And this company had the most sophisticated IBM mainframe available and a multi-million dollar investment in accounting software.

By adding an image management system with excellent work-in-progress software, the oil company was able to reduce its transaction processing costs by almost 30%

IMAGING: THE BIG PICTURE

Flexibility and business vision will shape imaging in the 1990s.



Did you know that if you loaded all the documentation relating to a Boeing 747 - all the designs, the mechanical drawings, the operations manual and so forth - onto an actual 747, the plane wouldn't be able to get off the ground? The sheer weight of the paper - some 450,000 pounds - would well exceed the maximum allowable load.

That's essentially what is happening in the business world today: Companies and governments are being weighed down by paper. All too often, they find themselves having to manage thousands, even millions, of new documents each year. As a result, they spend vast amounts of time and money simply shuffling the paper needed to support their business activities.

Imaging Relieves the Paper-Processing Bottleneck

Imaging technology has reached the point where we can cost-effectively relieve that paper-processing bottleneck and automate those areas of the workplace that heretofore couldn't be automated. In spite of the proliferation of computers in recent years, only about 1% of all corporate information is managed with computers. Nearly all the rest is on paper. So we really haven't eliminated a lot of paper; in many cases, we've only created more. While computerization has certainly streamlined many business processes, it has for

the most part simply automated existing operations - "paving the cow path," one wit has called it. Imaging, though, allows us to go beyond that and put paper-based business information online.

Unisys: A Leader in the New World of Imaging

Unisys is committed to being a leader in this new world of imaging. Over the past year, we have established cooperative agreements with many of the industry's leading imaging vendors - companies such as FileNet, Sigma Imaging Systems and Access - and we will continue to pursue such agreements with other innovative companies. We feel that this adds value to the systems we offer our customers and allows us to address their information management needs completely.

In mid-1989, we established a Corporate Imaging Office to coordinate the various activities within our imaging program. Known as Infolmage, this program is based on the concept that electronic imaging is much more than the ability to serve up pictures of documents. Rather, it's a whole new dimension in information management that can lower costs, speed up the delivery of visual information, improve customer service and, most important, enhance decision-making and management processes.



The InfoImage Suite of Solutions

In the fall of 1989, Unisys became the first major vendor with a full-scale imaging solution on the general market with the announcement of two imaging products: InfoImage IIPS (Image Item Processing System), which addresses the banking industry's need to handle a growing volume of paper checks; and InfoImage EDMS (Engineering Document Management System), which is designed to help manage the drawings and other visual information used by manufacturers, utilities and large facilities. More recently, we announced InfoImage Folder, a system that enables companies to manage related documents in electronic "file folders," routing them to the appropriate people for action and tracking work in progress.

In the coming months, our InfoImage suite of solutions will expand with the release of new products.

A Modular Approach to Grow With Evolving Technology

In developing our InfoImage products, we've chosen to rely on nonproprietary, open systems and to build our products around industry standards as much as possible. What's more, we've taken a modular, building-block approach with our imaging systems. This ensures that these systems can grow easily as a company's imaging needs grow, and that a business won't be locked out of future technological developments - an improvement in optical storage, for instance, could be easily incorporated without having to scrap an entire system. We recognize that imaging is an evolving technology, and we believe that this modular approach, along with our commitment to open systems, means that our imaging customers will have the flexibility to keep up with change, whether it's in information systems or the business environment.

Integrated Image-Enabled Information Systems

Underlying our InfoImage program is the philosophy that imaging should not be viewed and treated as an isolated, separate technology. It is really a tool to manage information, and to be most effective in an organization, it must interact with the other tools that manage information. That means integrating imaging into the overall information system.

In short, we feel that it is important to offer image-enabled information management solutions. Our technical expertise, combined with our long history of working closely with customers in government, manufacturing, banking and virtually every other industry, puts us in a good position to provide integrated systems tailored to a company's specific needs.

The Unlimited Potential of Imaging

We believe that the imaging marketplace will rapidly evolve over the next five years - and Unisys expects to be an integral part of it. As imaging is incorporated into traditional information systems - and indeed becomes a fundamental part of data processing - we'll see a whole new element added to the management of information.

Companies, of course, will be able to store and retrieve information more efficiently than ever before. But while the immediate benefits of imaging - the cutting of costs and the improvement of customer service - are already well documented, the long-range benefits and usefulness will undoubtedly go far beyond that. Once you get an appreciation of this technology, every time you turn around you'll see another use for it. And the fact is, nobody really knows what the real potential of imaging is, in terms of new products, new services, even new kinds of businesses. As one report recently pointed out, "the book on imaging has not yet been written." With InfoImage, we'll be working with customers to do just that, and explore the vast potential of imaging as we move into the 1990s.

UNISYS

We make it happen

while decreasing data entry errors by 25%. It also gained the less tangible benefits of improving supplier relationships and reducing finance charges.

TYPES OF IMAGE SYSTEMS

There are four generic image management system types. Each is based on document size and other factors relevant to the information. The size is important because it impacts the type of input and output peripherals, workstation needs and many basic architectural considerations.

General Business Systems

These systems vary depending on whether they are oriented toward transaction processing or a central repository function. In a transaction processing environment, image management systems improve the economics of managing the active life cycle of the document. In a central repository, the goal is to store vast quantities of images over a prolonged period of time.

Item Processing Systems

Item processing is a unique form of image management due to the small size of the documents and the very high scanner throughput required when processing them. For example, many banks process hundreds of thousands of checks daily within short periods of time, and the entire U.S. banking industry will process approximately 50 billion checks in 1990 at an average cost of five cents per check. Image management systems can increase processing throughput by 20 to 30% over previous systems. When this increased throughput is coupled with the decreased processing costs offered by image management systems, banks plainly benefit.

Engineering Drawing Systems

Engineering drawings may depict complex, two-dimensional product specifications or design plans for a simple bolt. Some of these drawings are up to 100 feet long or longer. They require special-width scanners and plotters in conjunction with specialized drawing software. Although many engineering companies employ CAD/CAM systems to create and manipulate drawings, those systems are not able to convert the massive base of paper drawings that currently exist. Image management systems can act as a bridge between

these two environments by electronically converting the paper drawings and storing them in digital databases.

Mapping Systems

Mapping systems are typically used to manage land use by government agencies. They can be used to assess tax bases by depicting the amount of available land, the number of buildings on the land and the number of new buildings the open land will allow. Mapping systems can also depict gas mains and underground wiring that may be impacted by construction. They need color and graphic capabilities as well as compatibility with dissimilar

Microform

The two components of microform, microfilm and microfiche, are the most cost-effective methods for storing inactive documents on a long-term basis. However, they are not appropriate for companies that can't tolerate a long out-of-file time, or for situations where documents may need to be accessed for active processing or reference.

Electronic Data Interchange

Electronic data interchange (EDI) is primarily used to transmit and receive business documents, such as orders and bills, between manufacturers and suppliers, according to predefined electronic formats. EDI works well in established customer-supplier relationships in which both parties have approximately the same level of automation. The problem with EDI is the great majority of business communication involves users who either can't utilize EDI because of the incompatible software and standards, or simply need more capabilities than EDI can provide. In these situations, imaging is appropriate.

VALUE, FUNCTIONS AND BENEFITS OF IMAGING

Why are Image Systems Strategic?

Image management systems are strategic because they give users a competitive edge. They effectively allow companies to implement improvements in management controls, reduce transaction costs and differentiate themselves from the competition—the most compelling reason of all for investing human and financial resources.

High-Value Applications

IDC refers to applications in which image management systems can provide a high return on investment as high-value applications.

Banks are obvious prospective users. High-value banking applications are check processing, mortgage loan processing, mortgage loan servicing, credit-card application processing, consumer loans, IRAs/Keoghs, international trade finance, international funds transfer, trust and stock ownership transfers. Of all these, IDC believes check processing, an industry in its own right, holds the most promise.

The high-value applications for image management systems in insurance are

Number of U.S. companies employing image technology systems

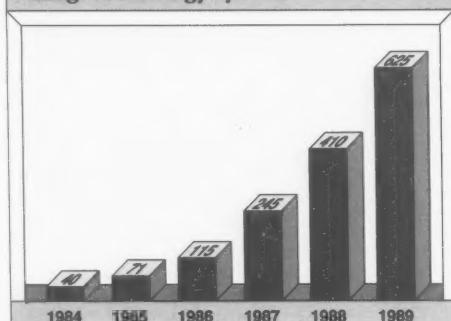


Image management systems have enjoyed rapid growth in the U.S.

systems at other government agencies. The Italian government, which rents many buildings and offices to its citizens, is currently using mapping image management systems to measure the floor space in these buildings in order to assess taxes on their use.

COMPLEMENTARY TECHNOLOGIES

Image management systems must coexist with other technologies such as optical character recognition (OCR), microform and electronic data interchange (EDI).

Optical Character Recognition

OCR is an alternative to manually indexing a document as required with image management systems. OCR views the dark and light areas around a specific letter and interprets, for example, a T from a P. It is important for users to realize that the OCR function takes processing time and specific software. The decision to manually index documents or use OCR depends on the application under consideration. OCR is most useful on structured documents such as business forms.

IMAGE MANAGEMENT SYSTEMS

underwriting, claims processing and investment management. In the pharmaceutical industry, image management systems show a high rate of return in case report form applications, regulatory affairs and medical libraries. Many high-value applications occur at the departmental level.

The American Express Paradigm

In its push to become the preeminent vendor of credit card services, American Express has been in the vanguard of image management system implementation. Now entering the fourth phase of its image management project, the company has leveraged its two-year lead in image implementation to enhance its statement printing operation and in so doing, differentiate its products from the competition's. The company's new monthly billing statement that depicts an image of each individual transaction is a good example. It has reduced its billing costs 25% and is working to reduce the amount of keying and, therefore, the number of data entry errors. The net effect of all this will be twofold: American Express will have the lowest costs and offer the most services.

Key Functions and Benefits

One key to successful image management system implementation is understanding its functions and benefits, for there are many of both. When functions and benefits are fully realized, users will save money, increase productivity and more efficiently utilize personnel. The first step in understanding functions and benefits is understanding how documents flow in and out of companies.

Organizations are required to process two general types of information—external and internal. It is very difficult to control

the form of incoming external information. Examples of external information include credit-card applications, mortgage loan applications, insurance applications, checks, requests for new drivers licenses or replacement birth certificates.

Internal information includes such items as sales reports, memos and production information. Controlling how it is created, disseminated and finally stored is easier than controlling external information. This control is being enhanced by the advent of increasingly standardized systems and more effective methods of document exchange.

Because there are so many nuances in implementing image management systems, the benefits and system design issues vary tremendously, depending on the particular application. Notwithstanding these industry and application differences, image management systems represent the best way to process external information. Building on that attribute, image management systems offer the following functions and benefits:

Digitizing Documents at the Earliest Possible Point

Mail rooms are the main points of entry for external information, and as such, likely candidates for image management systems. Managing the mail room has become an enormous challenge for large companies. In fact, many companies hire outside services to manage their mail operations, in the same way some data centers are managed. The reasons are simple: While the cost of the mail room was once assigned to general company overhead, more and more companies are trying to charge back departments for these services. Also, companies are trying to realize economies of scale.

Image management systems can reduce the sorting process and provide cost reporting and charging. Users benefit by capturing information at the first point of entry into the organization.

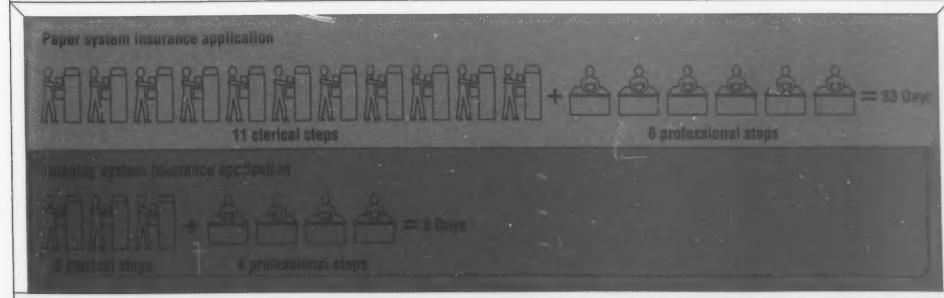
Example: One large health insurance organization processes more than 80,000 claims per day. When processed through a sorting procedure in the mail room, almost 1% of them were lost or misplaced in the initial sort. The second sort, by claim type, had a misplacement rate of 3%. A third sort, by processing category, had a 4% misplacement rate. The costs of tracking and rerouting documents plus managing the process and generating reports was costing this company in excess of \$4 million per year. As a result, the organization is now evaluating image management systems.

Electronic Routing

Electronic routing offers a level of structure and flexibility that a paper-based environment simply cannot attain. Two of the main benefits of electronic routing are multiple access and automatic rerouting. Paper-based business systems generally are serial—there is only one copy of the original document and only one person can access it at a time. In contrast, image management systems provide simultaneous access to the same document, allowing many elements of the business process to occur in parallel. In many cases, the total number of steps in the process can be reduced significantly while the time to process is shortened dramatically.

If an operator in a document processing operation is out sick or on vacation, the image management system can be configured, by either manual intervention or system defaults, to send the operator's workload to a back-up person. The system can

Insurance underwriting application



The improved efficiency and reduced work flow justify the expense of an image management system.

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Property Inspection and Appraisal Form

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O.E. O'Neill Agency
Agency Code Number
233004C
Prepared by
M.A. Peterson
Signature
M.A. Peterson

Describe Immediate Surroundings

Industrial
 Rural
 Urban
 Deteriorating
 Improving
 Subdivision
 Residential
 Isolated
 Rural

Inspection

Conditions if yes, explain

A. Any roofing missing or in poor condition?
B. Any portion of standing seam roof in water?

C. Any cleaning on your condition?

D. Any evidence of water damage?

E. Any insulation in terms of insulation?

F. Any missing and firm & firm?

G. Any evidence of water damage?

Yes No For the areas of maintenance after time of inspection

B
 C
 D
 E
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also be configured to take advantage of each operator's unique talents.

Example: A bank that processes mortgage loans routes them to operators based on the mortgage's value and whether it is residential or commercial. The system then automatically makes sure no operator has more than five mortgages in his or her work queue at a time.

Digitization

The advent of digital technology opened the door for image management systems, and gave them the opportunity to realize their true problem solving potential. One problem they have scaled back is out-of-file conditions.

Misplaced or out-of-file conditions have been a continual problem for businesses, particularly in their efforts to improve customer service operations. Digitizing and suitably indexing images ensures that files can never be misplaced and out-of-file conditions will never exist.

Example: The third largest private health insurance company in the United Kingdom recently announced its intention to service its 500,000 policy holders with an image management system. This company processes 4,000 claims per day. Locating a file within the paper-based system can be extremely unpredictable, since on average 5% of all client files will be in an out-of-file position at any time. The filing department is required to move 25,000 files per week, and at any time, 20,000 files will be out of the system.

Files that become misplaced on a permanent basis obviously pose an even larger cause for concern. In fact, a U.S. insurance company that lost the files of one particular client faces a \$60 million lawsuit because the insurance company disputes the client's coverage claims.

Reducing Data Entry Errors

Data entry is a notoriously mundane and poorly paid job with high turnover. Because of these factors, many errors creep into the process. However, this negative trend can be reversed.

Example: A local government agency implemented an image management system using sophisticated software that made the screen image of the document identical to the form data was being entered from. As a result, data entry errors were reduced 25%.

Numerous studies aimed at determining how to increase productivity and decrease errors have been undertaken. They have found the only two ways to improve data entry are increasing the amount of control the operator has over his or her environment, and ensuring the clarity of the input material. Image management systems reduce operator fatigue because they produce consistently clear images and can be configured for frequent operator breaks.

Research shows that operators work most efficiently when they have only one image on the screen at a time. In order to make sure they move as quickly as possible

flow automation—which expedites the movement of paper images from one processing point to another—an insurance company reduced the number of handling stages for an insurance claim from nine to three. Eliminating steps in the process is a crucial element of image management systems.

Reducing Physical Storage Space

Storage space is valuable and expensive. It is not unknown for companies to move entire operations to new buildings because of storage costs and availability. Many insurance companies in the U.S. are using 25% of their total office space for file storage.

Example: By implementing an image management system, a pharmaceutical company that generates 10 million records a year reduced its required storage space and avoided moving to a new building.

Reducing Document Retrieval Time

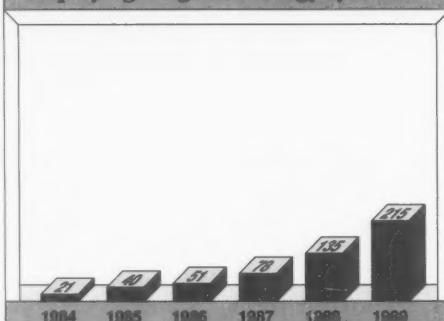
Increasingly, companies are competing to see who can give the best service. The faster claims or applications are processed, and customer inquiries are answered, the more likely a company is to beat the competition.

Image management systems excel at retrieving complete customer records quickly, allowing operators to answer questions in a minute or less. This results in dramatically fewer return calls to customers, and in some cases, lower requirements for customer representatives. It also results in happier customers.

Several companies that employed image management systems to recall records were initially afraid customers would balk at the time they waited on the telephone while their image-based records were retrieved. Since most records include images and data, the solution called for retraining sales operators in telephone techniques and requesting image files upon first customer contact. This provided baseline information and kept the customer service process going until the complete set of images could be retrieved and displayed.

Example: The cost of returning customer service calls is staggering in many companies. A major New York bank discovered it could save enough money purely on telephone costs to yield a

Number of European companies employing image technology systems



Although increasing, European implementation lags behind the U.S. pace.

ble from one screen to the next, users may program these systems so any one of their final keystrokes on one screen will prompt the next one. Unisys has extensive empirical evidence showing that an ideally configured image system can lead to a 100% increase in productivity across the entire population of data entry clerks in a check processing environment.

As OCR technology improves rapidly, the amount of keying will be reduced substantially. Intelligent document design is a critical element in this process. Potential users should start planning their document design now.

Facilitating Business System Redesign

Image management systems allow improvements in business systems beyond parallel processing and cleaner data entry. As management controls improve, the number of tasks in a process can be reduced.

Example: Using an image system and work-

IMAGE MANAGEMENT SYSTEMS

three-year payback on a multi-million dollar image system.

Improving Document and System Security

Paper-based systems offer limited security. The vast majority of image management systems have excellent security capabilities, including the ability to restrict access down to the individual document.

Example: A nuclear power plant wanted to minimize the number of engineering drawings that its employees could access. To do so, it implemented an image management system with a restricted amount of workstation memory and no local printing. The reduced memory reduced the number of drawings that could be accessed, and the absence of local printing made sure the drawings would remain in the system.

Improving Management and Government Report Capabilities

Image systems generate customized reports that make it easier for companies to track internal information. This reporting function is critical to organizations that are subject to government regulation.

Example: A midwestern bank was accused several times in the past five years of discrimination in its mortgage lending practices. Although the bank was able to prove that this was not the case in all but one charge, the cost of refuting the claims, including collecting the necessary documentation, were damaging. The bank subsequently employed an image management system to increase customer service and address legal questions cost efficiently.

Providing a Productivity Measuring Tool

Image management systems provide a very good basic tool for looking at individual productivity. This tool can sometimes be perceived as threatening. However, if used wisely, it can identify where bottlenecks occur and help effect a remedy. Example: A U.S. hospital rewards bonuses to clerical workers based on the number of accounts receivable they settle.

Eliminating "Knowledge-Based Downtime"

Frequently, by the time someone receives a paper-based document, that individual has forgotten why he or she requested it in the first place. As a result, users spend a significant amount of time

reevaluating documents. IDC calls this "knowledge-based downtime." In many cases, it decreases personal productivity by up to 15%. In addition, it is not unusual for knowledge workers to spend a total of 20% of their work day just trying to locate documentation.

Example: Based on information from available documents, state government tax auditors audited certain individuals and organizations. However, all documents needed to perform the complete audits weren't available. By the time they were—usually two-to-three days—the auditors were forced to access their original

operating alliances and third party relationships to service the industry- and application-specific demand for image management systems.

DEC has built image functionality into the lowest levels of its system architecture for almost six years, e.g. extensions to VMS. HP and NCR elected to play catch-up by acquiring software technology from Plexus Software, Inc. The two biggest technical challenges to all these vendors are seamlessly incorporating image technology into their existing office system architectures and developing workflow and procedural automation software. IDC believes most of them are ignoring software development in their quests for seamless integration.

THE ROLE OF THIRD PARTIES

Third party vendors can play several roles in the image management system market. First, they can customize a base system for a particular application. Second, they can concentrate on a particular part of the system technology such as OCR. Third, as in the case of Unisys, they can actually provide the components of the system platform. Because of their narrow focus in either capacity, they can be an important source of technology development.

Having realized the value of vertical market-oriented third parties, Wang signed up more than 100 third parties, while DEC, which maintains traditionally strong third party relationships, has more than 40. IBM, which in recent years abandoned its policy of strictly internal product development, has selected 30 third parties.

This diverse market requires systems vendors who intend to work with third parties to understand the needs of a wide range of users who want their systems developed by familiar vendors. This puts pressure on the vendors to offer a development environment that lends itself to customizing products across a broad range of applications.

THE SYSTEMS VENDORS

In 1987, Wang was the first systems vendor to enter the image management systems market. IBM followed suit a year later, in 1988. Although it was late to market compared to Wang, IBM still made somewhat of a hasty entrance by its normal standards. When it felt user demand and saw the market was heating up, Big Blue bypassed its normal meticulous preparations and jumped in.

Having entered the market in 1989, Unisys has developed an open and standardized environment. It has integrated and is installing outside technology into user-specific applications.

Unisys uses FileNet's back-end capabilities for file clustering, and its look-ahead software for retrieval. It has also licensed Sigma Imaging Systems' workstation software, which runs on a range of workstations.

Most of the other systems vendors such as Digital Equipment Corp., Hewlett Packard Co. and NCR Corp. have recently announced products. They are also devel-

A USER'S GUIDE TO THE MOST COMMON MISTAKES

There are plenty of potential pitfalls when implementing an image management system. Here are some dos and don'ts:

Do write a thorough, well-researched RFP. The vendor community has drawers full of RFPs it cannot respond to because they were so poorly written.

Number of documents stored by U.S. business in billions

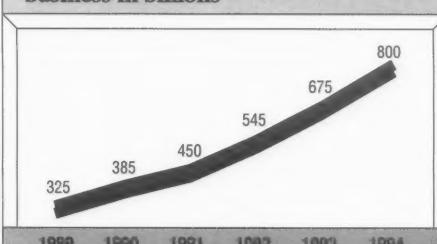


Image management systems can manage this avalanche of paper.

This is because many prospective users are not properly evaluating their needs in terms of functions and features. There is also danger in letting a vendor help you write an RFP. Since many system features are proprietary, a vendor could slant the RFP to the point where its competitors would not even bother to bid. That may result in a noncompetitive environment that costs the user a 15-20% premium. The solution is to get help. This can come in the form of an outside consultant or an internal task force.

Do change your business system.

Image management systems are not meant to operate in a void. If you are going to get the most out of them, it is necessary to make adjustments. This can result in modifying business practices, which in turn may result in hiring or reassessing personnel. The point here is that a user will maximize the value of its investment by looking at its system overall, rather than simply automating discrete steps that exist today.

Don't wait for standards.

There are sufficient standards to ensure that an adequate migration path can be put in place. By waiting for standards many companies could dilute a competitive advantage. In fact, many large banks and aerospace companies waited until they were at a competitive disadvantage before implementing systems. The message: Waiting is not free.

Don't put in a pilot system. Many users have put in small pilot systems for test or demonstration purposes. Since the technology is already proven in thousands of commercial installations, this is a waste of money. It can also be misleading. A pilot system with four or five workstations will not elicit the same architectural issues, or deliver as much performance as a larger system. As a result, user expectations can be skewed. This is not to say that the use of departmental technology and limiting the scope of the first application is not a valid strategy. IDC encourages users to build systems based on a modular approach.

TRENDS AND ISSUES

Standards

Since no user wants its image management system to exist as an island of automation, most vendors have invested

substantial resources to ensure their products are compatible with the IS world. As a result, the majority of image systems are able to emulate common terminals such as IBM 3278s and DEC VT-100s. Many also offer coexistence at the network level and run on popular database management systems from such firms as Oracle and Informix.

Many image management systems have made concessions to the data world by supporting SNA and TCP/IP Ethernet connectivity. Most also use standard CCITT Group 3 and Group 4 compression algorithms. Despite this, many systems will not

want to make their product the de facto standard.

Future Technological Developments

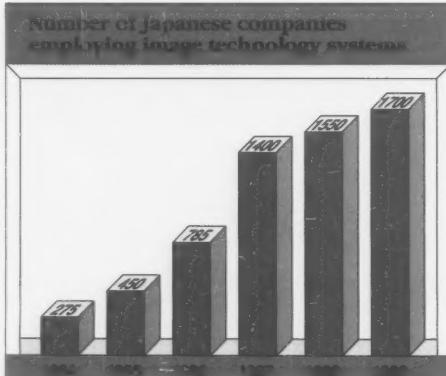
As image management technology matures, it will continue to place development demands on computer technology. Just as the large blocks of data composing a single image have pushed the limits of current systems, networks will have to be upgraded to accommodate heavy image traffic in the future. In an effort to keep pace, vendors have extended the capabilities of their database management systems and written extensions to SQL. Proprietary methods have also been employed to speed up the process of storing images to optical disk and reducing the number of seeks required to retrieve documents.

The most important design advancements will come in software. IDC expects to see enhanced intelligent character recognition and more flexible user interfaces. More advanced workflow software will allow users to designate processing paths without using a lower level language. Image management applications will also increasingly migrate away from proprietary processors to more universal host environments.

Component advancements will be marked by the movement of compression and decompression capabilities to the chip level on controller boards, where previously they were found on image processor boards. The storage densities of both magnetic and optical disks will continue to at least double almost every three years for the foreseeable future. There will also be advancement in subsystem interfaces and monitor technology.

Image management system technology has already shaped the way many companies undertake many of their fundamental business activities, and it is clear that it is affecting the development of general office system products. Image system technology will become so integrated with on-line transaction processing and office system environments, that by the mid '90s it will be impossible to separate the three areas. By that time, image management system users will have a seamless, standardized environment and the luxury of picking the best products from a competitive market.

But they shouldn't wait. The competitive advantages of image management systems are available today to those who decide to act.



While the U.S. leads Europe in implementation, Japan has about one-third more companies using systems. However, the dollar value of U.S. shipments is higher because more Japanese systems are based on less expensive personal computers rather than the larger processors more common in the U.S.

communicate with popular operating systems without extensions and the addition of proprietary board-level technology. Many also use proprietary hierarchical indexing techniques for the image index.

The standards that are available for such things as cartridge size and disk sector usage are receiving broad support. In addition, image management system vendors are pushing for standards that will provide compatibility across their competing products. New image transmission protocols are also needed, as existing data transmission protocols are insufficient for the larger image blocks that may be 50K bytes, 100K bytes, and larger.

There is a delicate balance to maintain here. Because the technology is still evolving rapidly, standards run the risk of being ignored in the quest for increased performance and functionality. This leaves a wide open market for innovative companies that

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COMMENTARY

James Daly

Its own worst enemy



Want to make a quick bundle in the Silicon Valley? Print up a few thousand bumper stickers with "Honk if you hate Bill Gates" printed on them and charge a couple bucks a piece. They'll be gone by nightfall, I guarantee. The horn blasts filling the valley, however, could be deafening.

While Microsoft's boy-wonder chief executive officer may elicit wide-eyed wonder from armchair entrepreneurs, the simple act of forming the syllables of his name is becoming an increasingly distasteful job for many. Sure, part of it may have a subliminal jealous edge, stemming from the fact that Gates reminds everyone of the nebbish they stuffed into lockers in high school and who later went out and made a fortune.

A more likely reason, though, is Microsoft's frequent use of business tactics that turn friends into enemies and enemies into candidates for the rubber room. In only a few short years, Microsoft has become the computer industry's common enemy, the J.R. Ewing, the George Steinbrenner, the Donald Trump, the Leona Helmsley — the company everyone loves to hate.

Continued on page 74

Faster Intel 486 may be snoozer

BY MICHAEL FITZGERALD
CW STAFF

Intel Corp. is working on a new 50-MHz 486 microprocessor, skipping over the 40-MHz level entirely. News of the chip drew yawns from analysts, but some users said they think it could prove valuable.

Intel sources said the new

processor, tentatively named the 4650, is expected to be commercially available sometime in 1991. It may even find some buyers if it is timed right. Last week, Intel officials denied published reports that said the 50-MHz chip is behind schedule.

Michael Purcell, manager of technology planning and information resources at Baxter

Healthcare Corp., said that Baxter does not see an immediate need for the chip but may want machines based on the chip in a year or so, depending on how its database projects develop.

"Anyone who wants to run database servers and offload things [from] mainframes would definitely be interested, but speed is the least of our prob-

lems," Purcell said. "How do you provide data integrity and the reliability? CPU performance isn't as big an issue as configuration, management and design of systems using new servers, and that's independent of the clock speed of servers."

The heat is on

Why would Intel come out with another 486 at a time when its 386 chips are just beginning to outsell the 286s and its original 486s are still not yet selling at high volumes?

Well, for starters, there is competitive pressure, observers said.

"Intel needs to worry about maintaining their preeminent position, and the more high-end stuff they have, the more defense they have [against chip clone makers]," said Michael Slater, editor and publisher of the Microprocessor Report. "They're also trying to keep the technical workstation market from going completely to the RISC environment."

Most reduced instruction set computing (RISC) chip makers are developing 50-MHz versions of their chips, so Intel needs to keep pace in the market, he said.

Dataquest, Inc. analyst Alice Leeper pointed out that the 50-MHz chip was part of the plan when the I486 was announced. "It was just a question of time," Leeper said. She added that the chip will be expensive and not easy for mainstream users — at least not in the short term.

"There's no question that the added speed adds value, but that's not the hardest problem," Purcell said. "The real problem is people and changing your organization to make fullest use of the technology."

FEATURE: PC SERVICE

PC service's mixed bag

BY MARTY LEVINE
SPECIAL TO CW

When a personal computer goes on the fritz at Dynamics Research Corp., an Andover, Mass.-based contractor for the U.S. Department of Defense, the company relies on internal resources to figure out what went wrong and to fix it.

"We have a group of three or four people in the company who are pretty good at servicing PCs," says Brian Camenker, a staff systems analyst at Dynamics Research. Only if the service personnel can't find the part internally will they go outside and order it, Camenker says.

Cannibalizing spare machine parts is only one of a myriad of approaches to servicing PCs, but like most others, it may not address all of the maintenance and service issues that can crop up in a company. PC managers are increasingly turning to a patchwork of options to keep their PCs up and running, weaving together in-house expertise, dealer support and specially crafted outside service agreements.

Kent State University in Kent, Ohio, for one, has converted its service department into a pay-as-you-go operation.

"End users on campus can have a contract with our computer equipment services group on a time and materials basis," says Grace Bush, deputy director of computer services at the school. "They've got a large inventory of parts

Continued on page 72



M.E. Cohen

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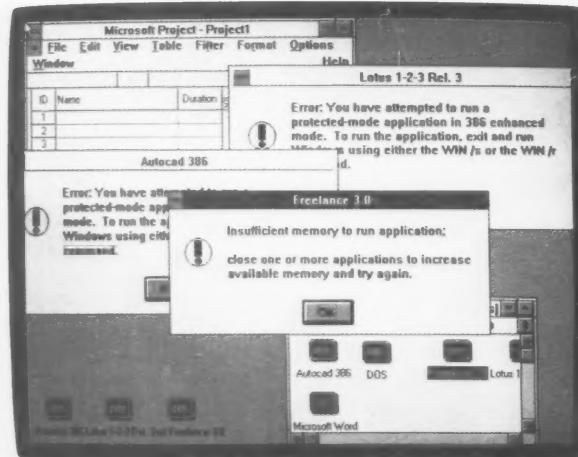
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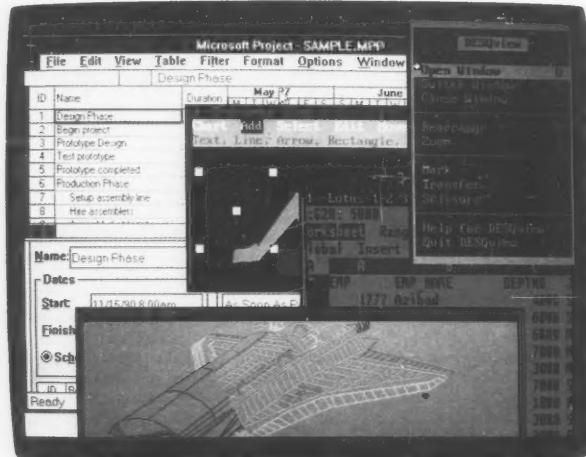


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This comparison was made using a system like the one you might run: Both shots show an ALR FlexCache 33/386 running DOS 3.3 with VGA display adaptor, Novell NetWare v3.01 Rev. A, with IPX/SPX v3.01 Rev A, Microsoft Mouse 7.00, and Microsoft SMARTDrive v3.03 disk cache. Buffers were set to 20.

For the Windows screen, we ran Microsoft Windows 3 HIMEM.SYS and EMM386.SYS. For the DESQview screen, we ran QEMM 386 v5.1.

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Voice system reins in agency's costs

Texas welfare office expects \$11,000 daily payback from PC-based system

BY RICHARD PASTORE
CW STAFF

AUSTIN — When your organization is as much as \$800 million in the red, it is often hard to justify expenditure for computer equipment. But at the beleaguered Texas Department of Human Services, an expected payback of \$11,000 per day made it easy.

The state's welfare agency is implementing a personal computer-based voice response system intended to curb the overprescription of a popular and costly class of ulcer medication. The savings resulting from the system should be close to \$4 million annually, including \$1.6 million in state Medicaid funds.

This savings looms even larger in light of a system implementation cost of only \$10,000. The turnkey list price was \$45,000, to \$48,000, but vendor equipment and services donations re-

duced that figure to \$10,000. However, toll-free telephone service costs could add as much as \$24,000 to \$30,000 per year to the bill, depending on use.

Even so, "as an MIS person, I have never seen a payback of this magnitude for this type of investment," said project technology leader Mark Moore.

Dosage dilemma

In late 1988, the agency determined that many physicians were prescribing maximum doses of certain ulcer medications far longer than the eight weeks recommended by the drug manufacturers and approved by the Food and Drug Administration.

Over half of the Medicaid patients who received the drug were prescribed levels that exceeded manufacturer recommendations, said Robert S. Nash, the agency's chief pharmacist and coordinator of the program. It was a costly over-

dose for the state. Texas spent \$18 million on the five drugs in this class last year — 8% of its entire Medicaid drug budget.

Unless the agency found a cost-effective way to limit use to the manufacturer's recommended levels, the high cost and escalating number of Medicaid patients "could have put coverage of these drugs in jeopardy," Nash said.

The agency looked at four or five vendors of voice-response systems and found some that cost more than \$1 million. It eventually tapped Atlanta-based Eva Technology, Inc., which donated some of the hardware and conducted surveys to determine potential users' reactions. With Eva's help, the agency installed the system in eight weeks and wrapped up the in-house programming in 200 man-hours.

The system, which is a pilot installation for the vendor, should be fully functional this

month and consists of two IBM Personal Computer ATs configured with Innovative Technology, Inc.'s Nita Audio voice boards and drivers. The PCs are each loaded with 2M bytes of memory and 30M-byte hard disks. One box acts as a backup to the other to guarantee 100% uptime. Four toll-free telephone lines hook into the PCs, which are linked by dial-up lines to the agency's Unisys Corp. 2200 mainframe.

A mainframe-based homegrown program conducts a weekly search of a database of Medicaid clients and identifies those that have reached the eight-week maximum dosage limit for the ulcer drugs. The program then automatically downloads these records — an estimated 15,000 per week — to a database in the PC.

When one of 10,000 participating physicians on 3,500 pharmacists calls the toll-free inquiry line, a prerecorded voice response will ask for his user access code and patient information. If the name is found in the PC's database, the voice will in-

form the caller that the patient has reached the limit and only a low-level maintenance dosage will be approved for Medicaid payment. If the name is not found, the caller gets a green light to fill a maximum dosage prescription.

Each response takes 30 to 45 seconds. Moore said he expects hundreds of calls per day, though the system can handle thousands. The PCs also keep track of who called, when, for what patient and what the response was. This data is uploaded to the mainframe weekly. "With that information back on the mainframe, we can see what we would have had to pay out," Moore said.

The possibility exists that the system can be applied to other drugs, but that will be some time down the road, Nash said.

However, other states could benefit now. "This is a problem that everyone contends with nationally," Nash said. The rest of the nation could save a total of \$100 million to \$180 million in Medicaid with similar systems, Moore estimated.

PCs take center stage in orchestra's fund-raising

ON SITE

BY RICHARD PASTORE
CW STAFF

NEWARK, N.J. — Jacques Cousteau needs donations to save sea turtles. Your Public Broadcasting Service station is pleading for pledges. The March of Dimes is descending on your door. Competition for contributions is expanding even as the money supply tightens.

To avoid getting lost in this charitable crowd, the nonprofit New Jersey Symphony Orchestra is hoping for an edge from personal computer-based fundraising techniques.

"The competition for limited resources is much more intense; if there is a downturn in the

economy, people tend to tighten their purse strings," said Tom McGrath, computer operations manager for the orchestra's 30-person administrative office. The 85-piece orchestra, which is operating on a \$6.5 million budget, will perform about 150 concerts across New Jersey and neighboring states this season.

PCs are playing an integral role in fine-tuning the group's fund-raising. For example, donors are more apt to renew their pledges if they are personally acknowledged on a timely basis, McGrath said. PCs are making that possible.

Under the orchestra's old system, pledges and personal data were keyed into an IBM Application System/400 Model B10, which holds a customized

database of 32,000 individuals that is accessed by virtually all of the orchestra's departments. When time permitted, the development department staff members rekeyed the donation data into their PCs and generated thank-you form letters.

"Re-keying radically increased the chance of error," McGrath said. "Sometimes things would fall between the cracks" — donors would get duplicate mailings or none at all.

Today, a donor whose gift is received on Monday will hold a personalized acknowledgment letter in his hand on Thursday.

The timeliness is made possible by IBM PC-compatibles, which download pledge data from the AS/400 each evening via IBM's PC Support communications software. The next day, development staff members use the PCs to select one of 12 thank-you letter styles and perform a mail merge that places the donor's name and address into the appropriate letter. The

system has cut entry time in half. "We get more control with the PC. [The users] can print whenever they want, not when I



Arthur Person

N.J. Symphony competes for scarce dollars with PCs

get around to it," McGrath said.

Besides reducing turnaround time, the orchestra is using PCs to sharpen its prospect target-

ing. "We don't want to wildly shoot from the hip, investing time in prospects that don't have interest in the symphony," McGrath said.

The goal is to monitor and hone the effectiveness of the costly prospect name lists with which the orchestra conducts mass mailings.

The development staff enters the day's incoming pledges into a Borland International Quattro spreadsheet, including the numeric code indicating which prospect list the donor's name originally came from.

The staff manipulates the donation dollar figures each day to show which name list is getting the best results, how quickly the various lists generate responses and so on.

The benefits of the PCs extend up to the director of development's office. When the director is on the telephone trying to coax a gift from a potential patron, he has that person's on-line data file at his fingertips.

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MICRO BITS

Microsoft taps Sytron's tapes

Microsoft Corp. recently tapped Sytron Corp.'s tape backup software for packaging with its upcoming LAN Manager 2.0 operating system. IBM also gave the nod to Sytron's Sytos Plus for use as a backup and restore utility for OS/2 1.2 and DOS 3.3 and 4.0. The backup software will support IBM's 6157 tape drives and 3 1/2- and 5 1/4-in. disk drives in the Personal System/2.

Indigo Software Ltd. and IBM signed a cooperative software marketing agreement under which IBM's direct sales force will market the Indigo printer soft-

ware, including Jetform-Design, Jetform-Filler, Jetform-Server and Jetform-Merge.

Central Point Software and Wangtek announced that they will bundle Central Point's PC Backup software with tape backup systems manufactured by Wangtek — specifically, its 40M- and 80M-byte drives.

Microsoft has announced that it is now shipping Version 1.1 of Word for Windows. It was designed to take advantage of the interface improvements to Win-

dows Version 3.0 and includes customer-requested file conversion improvements between the Word product family and macro functionality. Word for Windows can now read and write Word for Apple Computer, Inc. Macintosh files directly.

IBM Canada has acquired an 11% stake in **Delrina Technology, Inc.**, a developer of personal computer-based business forms-processing software. Delrina plans to develop a version of its Perform package for OS/2 and Presentation Manager. A Windows 3.0 version is slated to ship this summer. IBM already markets a DOS-compatible version of Perform.

Informix Corp. and **Du Pont Co.** have inked a pact that will enable Du Pont to

market and resell Informix's database management software products for use with Du Pont's Macblitzer computer. Macblitzer uses reduced instruction set computing technology to combine the processing power of Unix and the Macintosh through the Macintosh graphical user interface.

Wordperfect Corp. has begun shipping Planperfect 5.1, which features extensive mouse support and can share printer and font file information. It is completely compatible with Wordperfect 5.1 and includes an Office 3.0 shell, worksheet summary and list files. It costs \$495. Also shipping is Letterperfect 1.0, an entry-level word processor priced at \$299 and aimed at new users.

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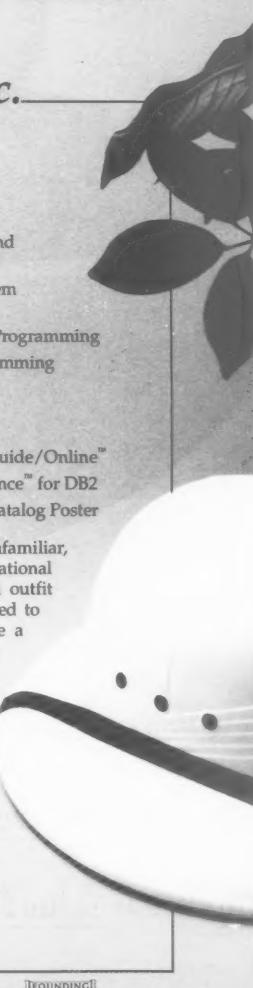
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Occam makes stats simple

BY JEAN S. BOZMAN
CW STAFF

WATERTOWN, Mass. — Statistics, no matter how exciting, do not lend themselves to easy analysis by the human brain — consider, for instance, baseball statistics. Yet plotting the frequency of Babe Ruth's home runs shows the burst of record-shattering slugging in the 1920s and '30s much better than rattling off the numbers by heart would.

Start-up company Occam Research Corp. has stepped up to the plate of modern Apple Computer, Inc. Macintosh II applications and is offering its relational database management system as an engine to analyze the numbers rows and columns of data found in corporate spreadsheets. Occam's product, called Muse, allows users to browse through "databooks" in typical Macintosh point-and-click fashion to discover underlying patterns in the on-screen spreadsheets.

"We're using natural-language English commands to control everything," explained Robert Roepel, a former Colgate-Palmolive Co. executive who is now Occam's marketing vice-president.

"We took four years of data, about 20 different Colgate-Palmolive products, and were able to cut that data into 60 slices," Roepel said. "Muse gives you a window on all that data without making you drill down through it, line by line."

Occam President George Potts built Muse on a homegrown relational database manager, a natural-language interface and the Macintosh's user-friendly icons. "Language-driven data analysis for corporate managers is a new way of looking at data and turning it into useful information," said Potts, who started the firm in 1988. The \$695 package is scheduled to ship in the first quarter of 1991. Muse runs on Macintosh SEs and Macintosh IIs with at least 2M bytes of main memory and at least Version 6.0.5 of the Macintosh operating system.

One unusual product feature of Muse is its ability to ask the computer English-language questions by issuing voice commands. Speaking into a microphone, Potts was happy to order his Macintosh II to display a comparison of Ty Cobb's and Babe Ruth's slugging records. Both color graphs showed steady hitting — and a burst in their most productive years.

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NEC

PC service

CONTINUED FROM PAGE 65

for a quick turnaround." For complicated repairs, such as hard disk drives, the service group subcontracts the work to outside service companies.

If anything, a combination approach is likely to gain in popularity because few companies are willing to invest in the people and resources necessary to keep service solely an internal affair, consultants say. However, comprehensive outside solutions are tough to come by.

PC managers and consultants who follow the service industry note that with outside service also comes the potential for loss of control over critical equipment, the possibility that the service provider won't fulfill its commitment and the likelihood that the service provider will fall short because it doesn't understand the customer's problems.

Part of the routine

Problems with service "happen all the time," says Jeff Kaplan, a director of The Ledgeway Group, a Lexington, Mass.-based consulting firm. "You talk to IS people and they say they prefer to [keep service] in house. Of course, central IS, which tried to ignore [PC service] or hoped it would go away, is trying to play catch-up. You can't say that any one approach is better than another."

How companies service their PCs relates closely to the machines' importance to operations. For financial institutions

and other companies at which several hours of downtime can steamroll into a mini-crisis, the cost for fast turnaround seems to be a grudgingly acceptable part of doing business.

However, for an increasing number of companies, blanket service contracts, with high annual fees in exchange for fast turnaround, are unacceptable.

Before going out on his own as a network consultant for large corporate customers such as Morgan Guaranty Trust, Lazard Frères and General Electric Consulting Services, Brian Livingston was responsible for PC maintenance at the New York office of the Union Bank of Switzerland.

"The type of service that's mainly required on microcomputers is the replacement of video boards, hard disks and motherboards. We found it was preferable for our own staff to replace video boards," he says.

The bank went to an outside service for hard disks and motherboards and had a commitment with a retail chain for anything else on a per-cost basis, he says. Even with hourly fees for service of \$105 for the first hour and between \$60 and \$75 for each additional hour, the arrangement saved the bank thousands of dollars. The combination of in-house and out-of-house service "cost us 20% of what we had been spending on a service contract."

Faced with blanket service contracts that typically range from \$150 to \$1,000 per PC, more and more companies are reaching the same conclusion.

One IS director for a Chicago-based in-

vestment banking firm suspects that when the numbers are in from a cost and benefit review he plans to do next year, his firm will cancel its service contracts in favor of a more flexible approach. "The fact of the matter is that very few things go wrong. The basic things just don't tend to break down. It makes sense to just stock spares for when they do," says the manager, who requested anonymity.

The same local dealer that built the company's approximately 25 PCs also services them. While the director finds little fault with the dealer's ability to handle basic repairs, the relationship falls short in two critical areas: Costs are too high for straightforward problems, and the dealer can't handle the more complicated — and more critical — problems.

"As we get into larger hard disks, 150 and 200 [megabytes], the controllers are sometimes a bit strapped. It's a software problem that's hard to diagnose, and even when you pull out a part and think you've got the solution, it may not be the case," the IS director says.

How does he handle those situations? "We used to have technicians come in and replace the drives, but now we handle it ourselves. We know what to look for, and we're better able to control things. I think you'll find that situation in a lot of shops."

That holds true in particular for LAN sites and companies with complex hardware/software configurations. "Unless they're very obvious problems, it's hard to get [the PC] to reproduce it," says Paul Zagaeski, a senior analyst for The Yankee Group, a consulting firm in Boston. "The service contract is one of the more expensive ways of handling the problem."

Getting a working PC back on a user's desk is only one aspect of service, he adds. Too often, the problem is tied to a specific software application, and he says most service technicians lack the skills to handle those situations.

Nothing to depend on

That attitude can also be traced to the spotty record of some vendors, value-added resellers (VAR) and third-party service companies, PC managers and consultants say. While individual companies within all three categories have forged successful service relationships with customers, it's a hit-and-miss pattern.

"A company such as IBM has a pretty strong reputation," Zagaeski notes. "Compaq has a mixed reputation. And then you look at Dell — one of the things they sell is 'the best service in the industry.' But it can still vary from one part of the country to the other within one company. It depends on the people you're dealing with in your market."

Zagaeski points out that as vendors search for ways to cut costs, service becomes an increasingly inviting target.

VAR service, both regional and national, has also been erratic, and many corporate PC managers remain leery of third-party service providers — particularly independents that may or may not outlast the length of the contract.

"I've used two, and I didn't have much luck with either of them," the Chicago-based IS director says. "One went out of business, and the other forgot we were a customer."

Although many corporate PC managers complain that dealers offer the same mixed bag of support, more of them turn to dealers for support than any other outside option, industry experts say. That

shouldn't come as much of a surprise, considering how aggressive some of the larger chains have become in the last year.

The Ledgeway Group estimates that retailers such as Businessland and Computerland derive 5% to 7% of their total revenue from service-related activities.

In the past 12 months, Businessland and Computerland have revamped their service programs, ostensibly to offer greater flexibility as well as better overall support.

"It's one of our three key issues, along with distributing product and the cost of operation," says Alan Andrus, Computerland's senior vice-president for service and support.

In large part, that concern reflects the evolution of the chain's customer base; five years ago, walk-in retail business rep-

The top 10 service features

Accuracy and competence are what users are looking for in PC and workstation service providers

1	Completing fix on first call
2	Field engineer with high level of technical competence
3	Phone software assistance
4	Parts next day
5	Field engineer who communicates well
6	On-site next day
7	On-site same day
8	Parts within four hours
9	Single vendor responsible
10	Quantity discounts

Source: The Ledgeway Group

CW Chart: Paul Mock

resented 60% of the chain's volume, while large accounts added up to 10%, the company says. Small business sales made up the remainder. In 1990, the numbers have reversed, with large accounts bringing in 60% of sales, compared with 10% for retail traffic.

As recently as 1987, Andrus concedes, Computerland's service "was not well organized. That's why I think so much of service is in-house today." Perhaps the most significant change in Computerland's service operations has been the "Cap and Retainer" program it rolled out last year to address the concerns of customers fed up with high annual contract fees. "The program reflects the good history some customers have with their equipment," Andrus says.

The program sets an annual retainer based on the customer's prior service needs. Service beyond that level is charged an hourly rate with an annual cap; total service charges in any one year will never exceed the cost of a blanket service contract.

"There are some companies that will love the [retainer program] because they feel they're only paying for what they get. But others may not like it because they want a flat number for budgetary purposes," says Leslie Fiering, an analyst at Gartner Group, Inc. in Stamford, Conn.

Also part of Computerland's revamped service program is an inventory option, in which the customer keeps spare machines on hand to replace those that fail. Computerland then picks up and repairs the problem machines and returns them to the company's spare inventory.

Levine is a free-lance writer based in Forest Hills, N.Y.

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Ventura Publisher Gold Series

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Daly

FROM PAGE 65

So pack the Chevy full of those bumper stickers and let's go. First stop: Adobe in Mountain View. For years, Adobe and Apple enjoyed a fruitful symbiotic partnership. Apple was an early investor in Adobe and the biggest customer of its Post-

script page description language. Postscript is often credited with launching the desktop publishing explosion, a phenomenon that in turn made a fortune for Apple.

But last September, Gates slipped in through the back door and announced that he and Apple CEO John Sculley were jointly developing a page description language of their own called

TrueType, effectively hacking off Adobe. CEO John Warnock sputtered with rage, calling the move "the biggest bunch of garbage and mumbo-jumbo I've ever heard in my life."

It should be no problem unloading some of the bumper stickers at Adobe. Warnock may even want to stock up: They make great stocking stuffers. Now we're off to Cupertino.

While Apple was yukking it up with Microsoft after the TrueType bombshell, Microsoft was busy developing Windows 3.0, a program that gives IBM Personal Computers and compatible machines the simplified windows-and-icons user interface that made Apple's Macintosh such a big hit.

After the Windows 3.0 announcement in May, Apple's

smiles suddenly turned icy — it's tough to beam when your buddy is trying to eat your lunch. Recently, Apple began scratching around at the door of its old friend Adobe, and the two have since inked an agreement to cooperate on future Postscript-based technology.

There's also the story about the tiff that reportedly occurred between Microsoft and Apple before the formation of Apple's software offshoot Claris. Sensing a threat, Gates supposedly warned Sculley that if Apple created Claris, Mac development would be a very low priority item indeed at Microsoft. Sculley would not be shamed around, however, and market forces later made Gates eat his words with a knife and fork.

Next, we'll set up our stand outside 3Com in Santa Clara. Microsoft and 3Com jointly devel-

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HOW'S THAT saying go? "With friends like these . . ."

oped the LAN Manager network operating system and were supposed to jointly market it as well. Until this year, Microsoft, which manufactures LAN Manager, only sold it through OEMs such as 3Com and IBM.

A little while back, however, Microsoft decided it could do a better job selling LAN Manager on its own, meaning that Microsoft will compete directly with 3Com and IBM. IBM is a big boy and can get no sympathy, but 3Com is a much tinier potato in the stew. How's that saying go? "With friends like these . . ."

Any of our little gems left? We could take a drive over to Santa Teresa, where IBM has a big headquarters and development lab. IBM and Microsoft were once the best of pals when they co-developed the OS/2 operating system. But now, IBM is supposedly miffed over the slowpoke pace of OS/2 acceptance, which one analyst blames on the fact that Microsoft will never provide a smooth Windows-to-OS/2 migration path and will instead milk Windows for all it's worth.

Or maybe we can unload some bumper stickers by meeting up with OS/2 users throughout the valley. Microsoft keeps shifting the amount of memory users will need for the system to run effectively.

Yeah, call Bill Gates a sharp businessman. Call him a marketing visionary. You can even call him a tough cookie. But don't worry: We'll have more of the bumper stickers printed up in about a week.

Daly is a *Computerworld* West Coast senior correspondent.

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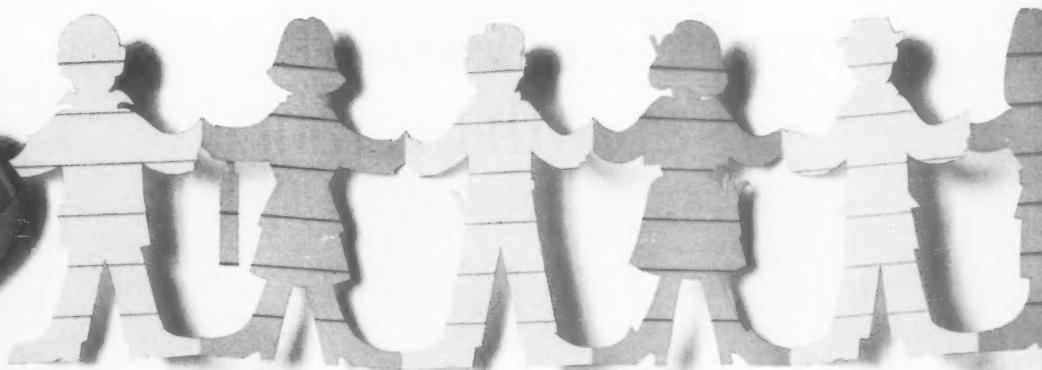
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NEW PRODUCTS

Systems

Epson America, Inc. has introduced the Equity 386SX Plus, an enhanced version of its Intel Corp. 80386SX-based personal computer.

The system includes 32-bit industry-standard architecture that enables users to access 80386 processor-oriented applications. It is also compatible with 8088- and 80286-based software packages.

The 386SX Plus is priced at \$1,999 for a 1M-byte version with a 3½- or 5¼-in. floppy disk.

A system with a 40M-byte hard disk

drive with 2M bytes of built-in memory and a 5¼-in. floppy disk drive costs \$2,999.

Epson America
2780 Lomita Blvd.
Torrance, Calif. 90505
(213) 539-9140

Cumulus Corp. has announced a small-footprint, Intel Corp. 80386SX-based personal computer that can be configured with monochrome or color monitors and floppy or hard disk drives.

The GLC/CO desktop PC features 1M byte of random-access memory; a 3½-in., 1.44M-byte floppy disk; a 16-bit IBM Vid-

eo Graphics Array adapter; a monitor; and a dual-button mouse. Two serial ports, one parallel port and 256K bytes of video memory are also included.

Pricing ranges from \$1,195 to \$1,895, depending on type of configuration.

Cumulus
23500 Mercantile Road
Cleveland, Ohio 44122
(216) 464-2211

Fortron/Source Corp. has introduced a 25-MHz Intel Corp. i486-based file serv-

The Netset EISA 486 is based on Extended Industry Standard Architecture (EISA). It can store up to 8M bytes of random-access memory and ensures a maximum data transfer rate of 32M byte/sec.

at EISA burst mode, the vendor said.

A basic system includes a 150M-byte small computer systems interface (SCSI) hard disk drive, 4M bytes of RAM and an EISA SCSI-based hard disk drive controller. It is priced at \$9,500.

Fortron/Source
6818-G Patterson Pass Road
Livermore, Calif. 94550
(415) 373-1008

Software applications packages

Abtech Corp. has announced an Abduction Induction Mechanism (AIM) machine learning tool designed for IBM Personal Computer ATs, XTs and compatibles.

AIM-PC provides users with a complete environment for creating, evaluating and implementing network models that contain mathematical functions not constrained by neuron analogies, the vendor said. System requirements include DOS 3.3 or higher, 640K bytes of random-access memory and a hard drive. A math coprocessor is recommended.

Pricing begins at \$495.

Abtech
700 Harris St.
Charlottesville, Va. 22901
(804) 977-0686

Macromind, Inc. has announced a developer's version of Macromind Three-D, a three-dimensional animation, rendering and video production tool for users of Apple Computer, Inc.'s Macintosh.

The product comprises three modules: 3-D Works, an animation module for importing 3-D models; Render-Works, a visualization module in which color, texture maps and other attributes are applied to models and animations; and Image-Works, a compositing and output module for digitally composing 2- and 3-D images and animations.

The product costs \$1,495.

Macromind
410 Townsend
San Francisco, Calif. 94107
(415) 442-0200

Holland Systems Corp. has announced a family of computer-aided software engineering products designed for Intel Corp. 80286-based IBM Personal Computer ATs or compatibles equipped with 640K bytes of memory.

Proplanner, Prodeveloper and Promanager include integrated software that supports detailed methodologies such as just-in-time education and on-site consulting.

Prices range from \$3,300 to \$19,500, depending on model, type of license and hardware configuration.

Holland Systems
305 E. Eisenhower Pkwy.
Ann Arbor, Mich. 48108
(313) 995-9595

Financial Systems Software (UK) Ltd. has announced an upgrade to its Universal Yield add-in and Universal Options add-in products.

The enhanced products support Lotus Development Corp.'s 1-2-3 Release 3.0 running under DOS or OS/2. The add-in products handle most fixed income products as well as European and U.S. options on shares, bonds, commodities, futures and currencies.

Prices range from \$570 to \$1,520, depending on type of product and type of

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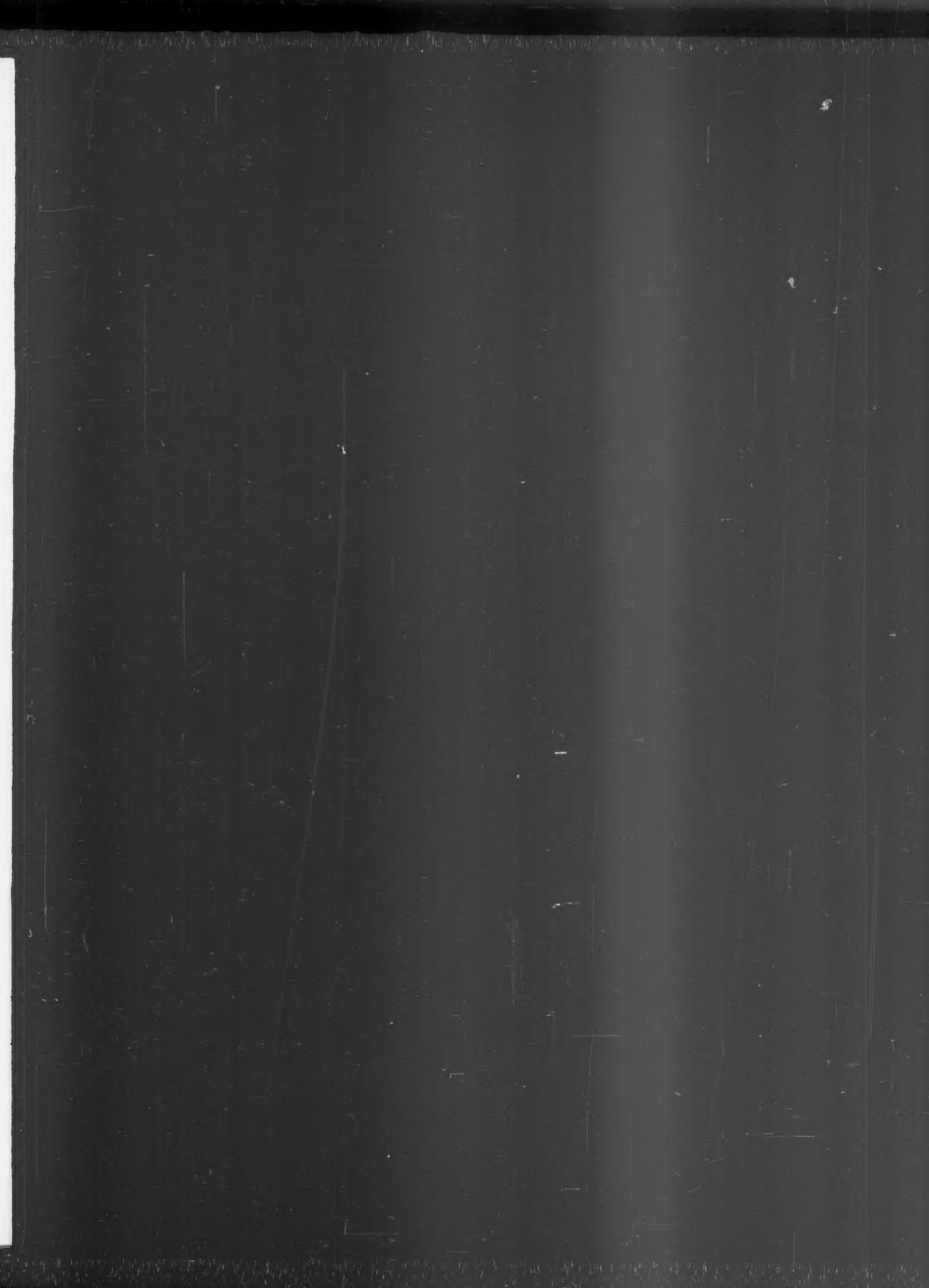
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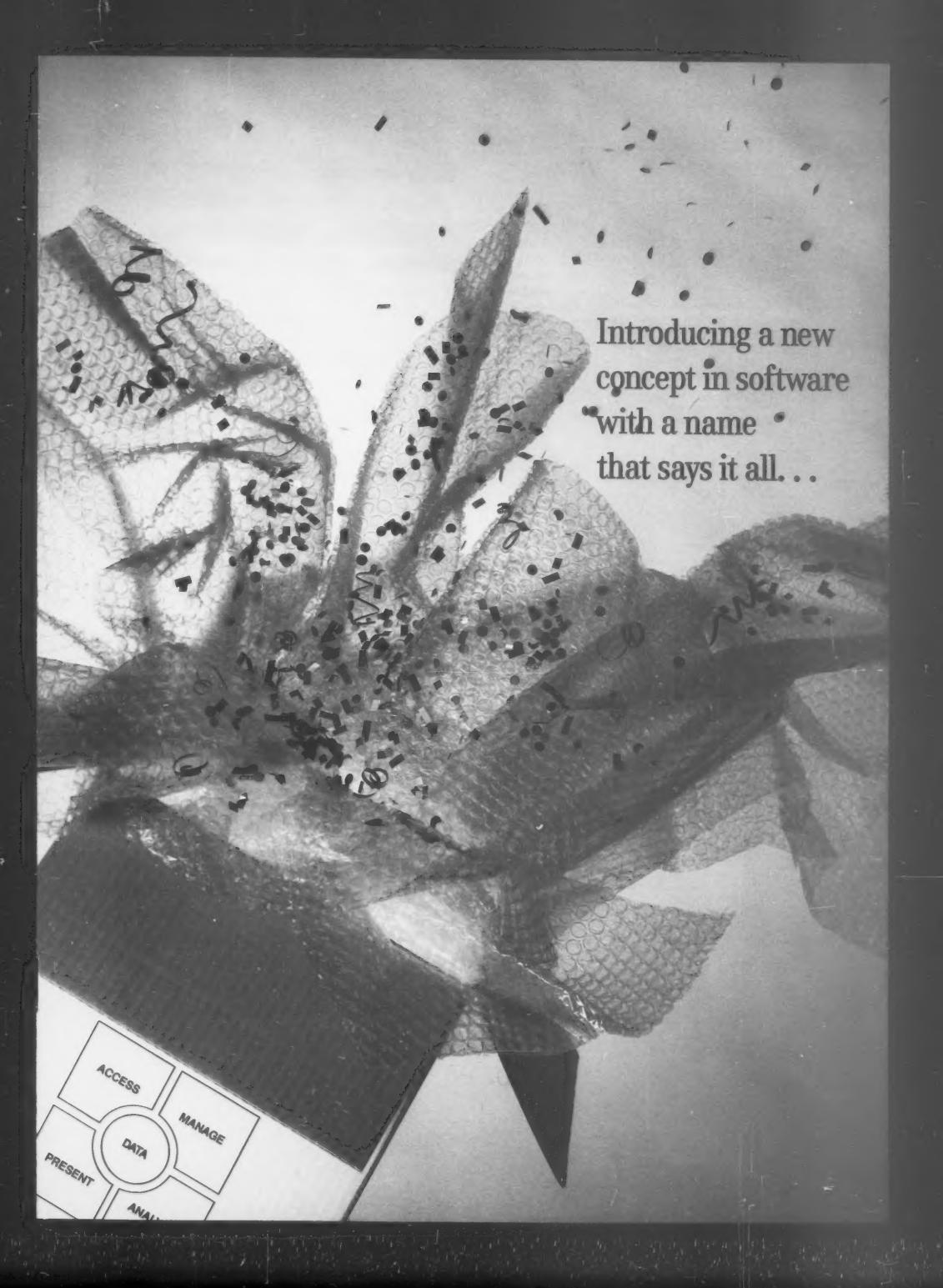


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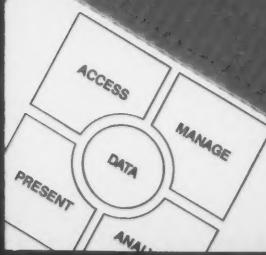
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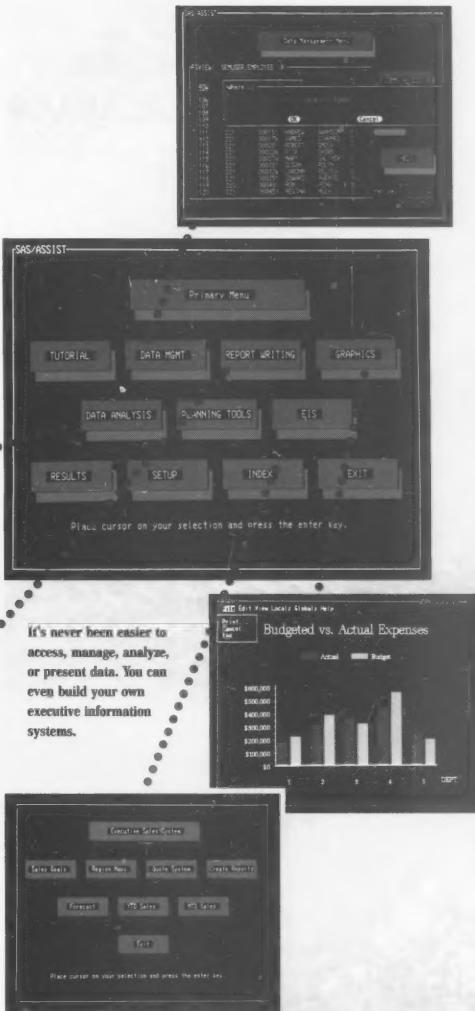
And now the SAS System means even more. It means you have the flexibility to choose software from an *applications* point-of-view instead of a hardware point-of-view. It means you can master the four key data-driven tasks — data access, management, analysis, and presentation — through a single software system. It means you can extend applications to more computer users, regardless of experience level. And it means you'll be the beneficiary, not the victim, of emerging computing technologies.



We've put the emphasis on the end results.

With the SAS System, it doesn't matter who's running an application. Or how. Or where. You can approach the SAS System from any experience level in just about any environment and be assured of the same reliable results.

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The menus, powered by keywords, make it even easier to run the SAS System's most widely used applications. Without having to know a word of syntax, users can access a data base...read in data...perform analyses ranging from simple statistics to specialized applications such as forecasting, project management, and quality improvement...and generate a variety of reports and graphs.

If you're approaching the SAS System from an applications development viewpoint, you'll find all the capabilities you'd ever expect in a powerful and productive programming environment. And then some.

There's a command-driven interface especially for systems analysts, applications developers, MIS personnel, and the Information Center staff.

From this interactive windowing environment, you can use the SAS System's English-like commands to build applications in a fraction of the time. And you can customize any application any way you choose by adding user-friendly menus and fill-in-the-blank screens.

We've made sure you'll never get boxed in.

While the industry struggles to define a common operating environment, the SAS System eliminates the need for one.

Our exclusive MultiVendor Architecture™ gives you the power to decide where a particular application belongs — in the data center, at the departmental level, on the desktop, or a combination of all three. The SAS System, and the work you do, is portable across the entire range of computing environments.

A dynamic programming interface lets you customize your development environment. As your program takes shape, so do the results.



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Directly access and manipulate the SAS System's English-like command language.



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With the SAS System, you'll always have state-of-the-art software for state-of-the-art equipment. You'll never again be boxed in to a particular hardware platform.

And that's a promise.

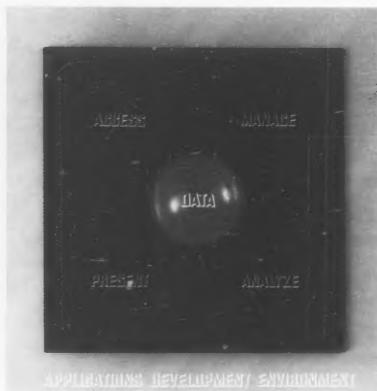
SAS software lets you stay on the leading edge of such new technologies as native windowing.



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your hands on data without having to

know data base terminology, and without sacrificing data base security. What's more, the SAS System's support of SQL gives programmers a standard language for data query. The SAS System can also be used to access raw data files in any format — even files with messy or missing data.

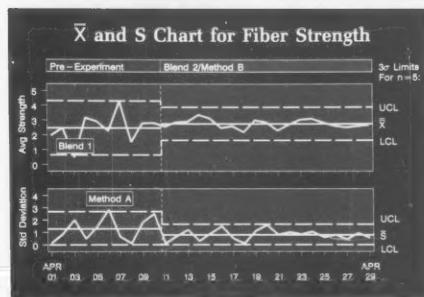
But getting data from place to place is just part of the challenge. Data *management* is also key, and the SAS System responds with efficient ways to enter new data...edit and query data files...and manipulate your data. You can even merge data from totally different kinds of files. And your inexperienced users can enter their data through customized fill-in-the-blank screens that look exactly like your business forms.



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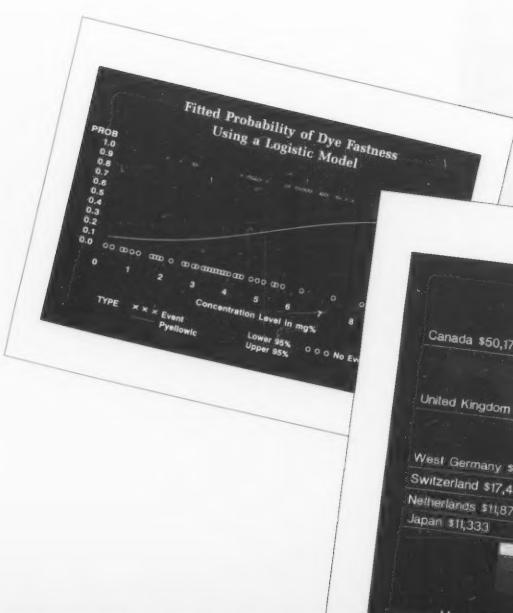
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Software utilities

Intex Solutions, Inc. has announced a version of Rescue Plus that is compatible with Lotus Development Corp.'s 1-2-3 Release 3.0 spreadsheet.

Version 1.3 of Rescue Plus was designed to recover lost or damaged 1-2-3 files. It provides normal and severe recovery levels for corrupted spreadsheets and includes an undelete feature for recovering bad sectors or recovering data from one drive to another.

The product is priced at \$150.

Intex Solutions
161 Highland Ave.
Needham, Mass. 02194
(617) 449-6222

KnowledgeSet Corp. has announced a Sun Microsystems, Inc. Sparstation version of its Graphic Knowledge Retrieval System (KRS), a software package designed to run under Sun's Open Windows 2.0.

The product enables data stored on compact disc/read-only memory to be immediately retrieved from DOS-based personal computers, Apple Computer, Inc. Macintosh systems or Sparstations.

The Sparstation version of Graphic KRS will be available in the fourth quarter. Pricing begins at \$112.

KnowledgeSet
888 Villa St.
Mountain View, Calif. 94041
(415) 968-9888

Vogon Enterprises Ltd. has announced Qic-Pak, a line of hardware and software packages designed to facilitate data interchange among computer systems on industry-standard 1/4-in. data cartridge tapes.

The family includes Qic-Pak-I (\$695), Qic-Pak-II (\$995) and Qic-Pak-III (\$1,995), each of which can be used on IBM Personal Computer ATs, XTs or Micro Channel Architecture-based systems running MS- or PC-DOS. Qic-Pak-III features Qtape, a utility that enables users to extract data that has been recorded in various backup formats.

Vogon Enterprises
94 Easthampstead Road
Wokingham, Berkshire
RG11 2JD, UK
(044) 734 890042

OS/2 software

Inner Media, Inc. has announced a software package designed to expand OS/2 Presentation Manager applications further than the confines of a single personal computer screen.

The Wideangle Desktop Expansion program provides a desktop consisting of nine contiguous screen-size workplaces. Each workplace contains at least one application, and users are able to move among any of the nine stations.

The product can be installed in any OS/2 Presentation Manager System. It is priced at \$129.

Inner Media
60 Plain Road
Hollis, N.H. 03049
(603) 465-3216

Board-level devices

Antex Electronics Corp. has introduced an add-in board designed for IBM Personal Computers and compatibles that integrates high-fidelity digital stereo audio output, extended IBM Video Graphics Array graphics and NTSC-compatible video output onto a single card.

The AV-16 Audiographics card can be used for applications in which audio must be digitally stored, processed and interleaved with full-color graphics.

The product is priced at \$895.

Antex Electronics
16100 S. Figueroa St.
Gardena, Calif. 90248
(213) 532-3092

Commax Technologies, Inc. has announced an Intel Corp. I486-based IBM Enhanced Industry Standard Architecture (EISA) bus-based board that features hardware and software speed control to enable users to switch between 25- and 8-MHz operations.

The Excell 486 EISA is a 32-bit CPU board designed to be binary code-compatible with the Intel Corp. 80386 processor. It accepts a 32-bit interface EISA bus address card and includes 4M bytes of standard dynamic random-access memory.

The product is priced at \$3,600 for quantities of 100.

Commax Technologies
2031 Concourse Drive
San Jose, Calif. 95131
(408) 435-5000

STB Systems, Inc. has introduced Powergraph Ergo-VGA, a graphics card that adds the Video Electronics Standards Association's (VESA) 72-Hz refresh options to all display modes in the hardware level.

The product supports VESA-compatible extended graphics and text modes at the firmware level. It incorporates advanced BIOS functions and a VESA compatibility interface in read-only memory.

Other features include 256K bytes of random-access memory and a maximum graphics resolution of 1,024 by 768 pixels with 256 colors. A 1M-byte unit is priced at \$499.

STB Systems
P.O. Box 850957
Richardson, Texas 75085
(214) 234-8750

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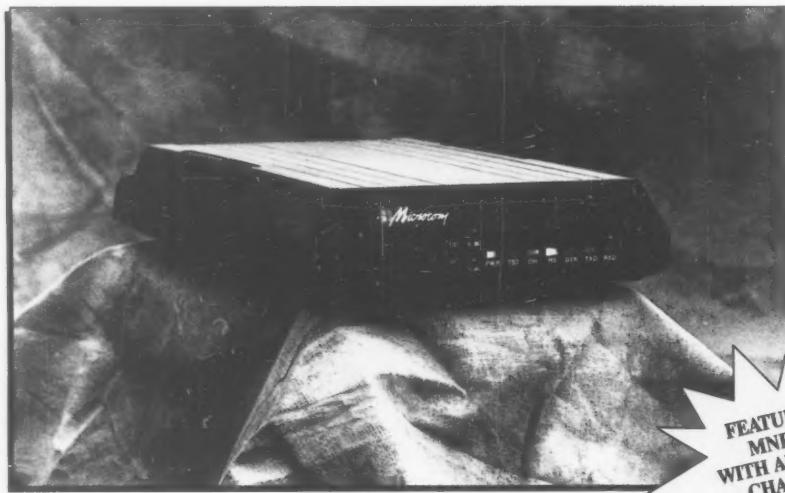
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NETWORKING

COMMENTARY

Ellis Booker

Images bite big bytes


The electronic imaging bandwagon has picked up lots of passengers of late — an enthralled group of computer vendors, chief executive officers and applications developers. But at least one person stands on the sidewalk, worriedly shaking her head. It's the data network administrator.

Her anxiety comes from this simple fact: Sending image files (even compressed files) across computer networks, particularly wide-area networks, is a bandwidth-intensive undertaking. Consider that the average compressed electronic mail note is .5K bytes, whereas the average compressed image is around 70K bytes. Sending the former over a 2.4K bit/sec. synchronous line takes around 1.67 seconds; the latter takes close to four minutes.

Even speedy local-area networks may sag under the weight of this new requirement. Vendors confidently report that a properly designed network can convey images at under 20 seconds a pop. But take out your watch. Tick off 20 seconds. That can be an eternity for users who have come to expect subsecond response time.

Continued on page 92

BY ELLIS BOOKER
CW STAFF

Slowly but surely, the incompatibility problems clouding the Integrated Services Digital Network (ISDN) landscape are lifting.

Public network switches from Northern Telecom and private branch exchange (PBX) switches from AT&T were recently interconnected over a Primary Rate Interface line.

ISDN, an end-to-end digital technology for the public phone network, specifies two access types: a Basic Rate Interface composed of two 64K bit/sec. B channels for voice and data traffic and one 16K bit/sec. D channel for carrying packet data network signaling and control information.

While users and ISDN watchers welcomed news of yet another interoperability test, several complained that past irreconcil-

able differences among switching systems — AT&T and Northern gear are by far the two most widely used by local and interexchange carriers — are partly to blame for ISDN's slow deployment in this country. They also noted with frustration that even within a single vendor's product line, ISDN equipment may not interoperate.

"Everyone's putting pressure on [Northern] and AT&T," said W. Edward Hodgson, man-

ager of computing and communications at Schindler Elevator Corp. in Morristown, N.J.

Hodgson, a chairman emeritus of the ISDN Users' Workshop of the 3-year-old North American ISDN Users' Forum, speculated that technical representatives from both AT&T and Northern resisted requests to modify their switch architectures.

In the meantime, Hodgson said, specific applications developed by the user community will wait. Even once these compatibility issues are settled, he said

Continued on page 82

New federal database aims to snag problem doctors

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Health and Human Services (HHS) has begun taking names — the names of bad doctors.

The agency is building a nationwide database of physicians and dentists with records of malpractice, which hospitals are required to check before they hire or retain any doctor.

HHS officials said they hope the National Practitioner Data Bank will strengthen the ability of the medical community to police itself and "reduce the likelihood that incompetent practitioners can avoid detection by moving from one state to another," said Robert G. Harmon, administrator of the Health Resources and Services Administration, an HHS unit.

Harmon estimated that the database will receive roughly 50,000 reports of malpractice per year and that the program will respond to about 1 million queries per year.

The database will reside on an Amdahl Corp. 5880 mainframe at a Unisys Corp. facility in Camarillo, Calif. In January 1989, Unisys won a five-year, \$15.9 million contract to design and run the database.

Many aspects of the program, established by the U.S. Congress in 1986, are mandatory. All malpractice payments and disciplinary actions made after Sept. 1 must be reported to the database, for example.

Furthermore, all hospitals must query the database every two years to check on their current staff of medical professionals, as well as new applicants they are considering. Queries

Parallel process

Sources such as insurance companies and state medical boards feed malpractice case information into the National Practitioner Data Bank



Source: U.S. Department of Health and Human Services

CW Chart: Paul Mock

cost \$2 per name searched.

The American Medical Association supports the program and believes it has adequate protections for the privacy of doctors, especially since individual records will not be made public, a spokesman said.

To ensure confidentiality and security, access to the database is limited to authorized organizations involved in medical licensing, clinical privileges and professional society membership. The general public will not have access, except to aggregate statistics, because Congress felt the

information requires some professional interpretation.

In fact, because of concerns over security, there will be no dial-up access to the database at all, according to John Hansan, the Unisys project director. Instead, paper reports to the Camarillo facility will be keypunched into the database and queries answered in hard-copy or magnetic-tape formats, Hansan said.

Doctors listed in the database will routinely get a copy of reports about them and have the opportunity to dispute the accuracy of the reports.

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The Past, Present, and Future
of Network Computing.

User firms eye disaster-recovery net

BY GARY H. ANTHES
CW STAFF

At least two dozen New England companies are considering the formation of a partnership to develop a digital microwave network for redundant, fault-tolerant communications of data and voice.

The private shared network would provide multiple-access, diverse-route connections to local telephone companies and the long-distance networks of AT&T, MCI Communications Corp., U.S. Sprint Communications Co. and other fiber-optic carriers in Boston and New York.

Each company site would have two microwave antennas providing alternate communications paths at speeds up to 45M bit/sec. Each of these nodes would also serve as a repeater site for the network as a whole. If communications were interrupted because of a cut cable at one location, for example, communications would be reconfigured to a different carrier or to a different pathway using the same carrier.

"The ideal is to catch every carrier at two locations," said Dick Kaufman, president of Richard N. Kaufman & Associates Ltd., which is advising the companies con-

sidering the partnership.

A network operations center would be established and jointly run by member companies. It would monitor the network and redirect traffic when problems occurred, Kaufman said. Depending on the sophistication of the center's software, the network might also offer bandwidth on demand for handling a company's peak-load requirements.

"It's a third alternative to communications," Kaufman said. "You can go to a carrier for a virtual private network, you can build your own, or you can enter into a partnership arrangement with a bunch of

users." He said the arrangement ought to offer more flexibility and lower costs for the members, but he said the driving force behind the idea is disaster recovery.

Kaufman said each member will subscribe in advance to a certain amount of network capacity. Then, the company will share in the cost and ownership of the network in proportion to that bandwidth and the number of miles it extends.

A second phase of the project might include adding a shared satellite uplink for very small-aperture terminal communications, Kaufman said. "The goal is to have a very secure network with all kinds of alternate routing and redundancy."

Kaufman said the firms involved include insurance companies, manufacturers, a chemical company, a data processing services firm and a number of other firms, most with multiple offices in the Boston/New York corridor.

ISDN

CONTINUED FROM PAGE 79

there will be a lag time as existing applications are transferred to new ISDN networks.

Remaining incompatibility between customer premises switches and those used by local and long-distance central offices are "still problematic," agreed James A. Johnson, a deputy program manager at Barksdale Air Force Base in Louisiana. But he went on to note that "normally you will have one or the other switching vendors ... your problem is long-haul interconnectivity. If they're working that out, that's a big plus."

Johnson was part of the ISDN interoperability trial at Mather Air Force Base in Sacramento, Calif. That test, ended prematurely in April on word that the base would be closed in 1993, is being reinitiated at Barksdale and will be running again in 12 to 18 months, Johnson said.

"As users, we're extremely anxious for these [compatibility] issues to be resolved," said Jeffrey Fritz, a data communications analyst at West Virginia University's telecommunications department. "It seems like ISDN has taken a long time to get where it needs to go."

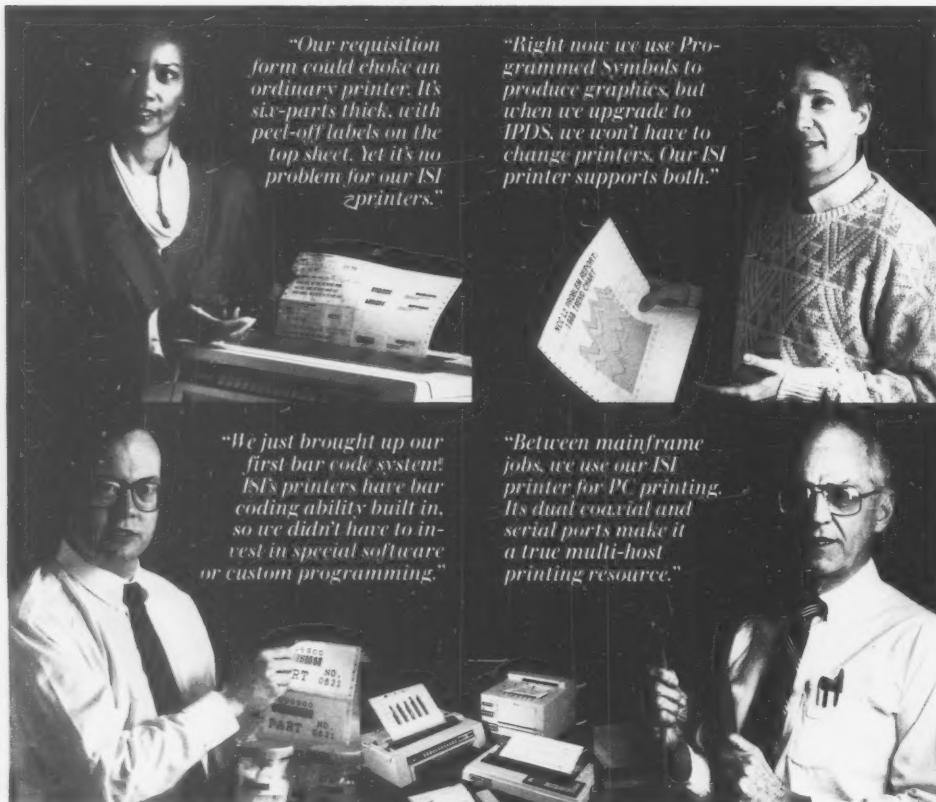
The university recently skirted difficulties in its own ISDN test laboratory when it learned that the local telephone provider had decided to upgrade a central office in downtown Morgantown, W. Va., with an AT&T 5ESS and not a Northern Telecom machine, which might have been unable to work with the 5ESS that supplies the main campus' Centrex ISDN.

Northern and AT&T have already hammered out an interoperability scheme for Northern's Meridian 1 Communications System (both the Meridian SL-1 and the SL-100 PBXs) and AT&T's interexchange switch, the #4ESS. The two said last week that work to link the Meridian 1 and the #5ESS, a local phone company switch from AT&T, is under way and is expected to be completed in 1991.

The test involved the following ISDN services: voice traffic, circuit-switched data, calling line identification and call-by-call service selection, which attaches network routing instructions to each call instead of designating a specific facility for all calls placed over one trunk line.

Field testing of the DMS-250 and DMS-100 and AT&T's Definity Generic 1 and Generic 2 systems are set to begin in the fourth quarter.

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Networld management needs resurface

BY JIM NASH
CW STAFF

A rising, grumbling tide of network discontent washed over Networld '90 Dallas last week. For months, users and analysts had become increasingly vocal in their demands for greater network management abilities, both in heterogeneous and homogeneous workspaces.

Several Networld '90 introductions addressed these demands. AT&T Computer Systems announced Release 3.4 of its Stargroup LAN Manager Server network operating system with support for

AT&T's Unix System V Release 4.0, AT&T's Starserver E work group system and 16M bit/sec. token-rings. The company also introduced a software product called Systems Manager that manages Simple Network Management Protocol devices in local- and wide-area networks and provides a graphical user interface.

Northern Telecom, Inc. announced DPN Lanscope, a software package that is said to perform problem isolation and performance and usage monitoring across LANs that are interconnected via Northern's DPN-100 packet switches.

Hewlett-Packard Co. announced soft-

ware that lets the HP 4972A LAN protocol analyzer troubleshoot LANs based on Ethernet and Novell, Inc.'s Netware.

Wave Technologies Training, Inc. in St. Louis announced new training, support and network management services.

Of particular interest in terms of network management was activity that went on throughout the conference — behind a shroud. Lante Corp. managed the immense number of connections and interactions specially organized for Networld '90 from a draped partition within its Shownet booth. Lante's system was designed to locate the position and scope of

any network problem within 30 minutes, said company President Mark Tebbe.

Overall, Lante was in charge of getting products from companies such as AT&T, CC:Mail, Inc., IBM, Gupta Technologies, Inc., 3Com Corp., Novell and Spider Systems working in concert. The consulting firm has designed a lot of networking ties, including a promotional golf game and comprehensive messaging services.

Electronic mail software vendor CC:Mail coordinated electronic requests for information based on the types of products marketed by companies. Lotus Development Corp.'s Notes software product posted messages, user-group session times and party updates. Custom software was created by Lante to monitor the application level of the network.

While Lante had asked several vendors to provide commercially available network management products, Tebbe claimed that none of the available offerings could manage a heterogeneous environment that included IBM's LAN Server, Microsoft Corp.'s LAN Manager 2.0, Novell's Netware 386 Version 3.1 and 3Com's 3+ Open Version 1.1e.

In the end, Tebbe said, he wrote a single-use program to capture and interpret the packets that were flying around the Dallas Convention Center. "It's not magic," he said. "We just hacked together what we needed. It's a kludge — I'll be the first to admit it."

Network General's Sniffer and Novell's Lanalyzer were used to monitor the operating system level. On the physical level, there was token-ring, Ethernet and fiber. Cabletron Systems, Inc.'s Lanview and Network General's Sniffer monitored that layer.



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BIT BLAST Codex, Proteon make connection

As part of its strategy to be a full provider and integrator of communications systems, Codex Corp. has signed an agreement to market Proteon, Inc.'s full line of token-ring networking and internetworking products.

Under a joint technology development agreement, Data Switch Corp. will incorporate Proteon's local-area network technology into its data processing and communications switching and control systems. Data Switch plans to announce products based on the integration this fall.

U.S. Sprint Communications Co. has filed a price reduction for the 56K bit/sec. data services it provides for FTS 2000, the federal government's telecommunications system. It will be the seventh time the firm has lowered its prices on FTS 2000 services.

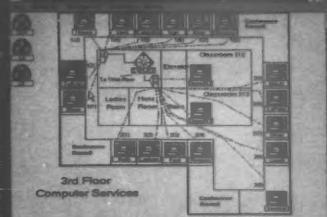
Interlink Computer Sciences, Inc. has announced a support agreement with IBM under which users can call up IBM's National Service Division support center for first-level support of Interlink products. Interlink sells a family of products to interconnect IBM and Digital Equipment Corp. communications systems, as well as connections between IBM and Transmission Control Protocol/Internet Protocol networking environments and a bridge and router software line.

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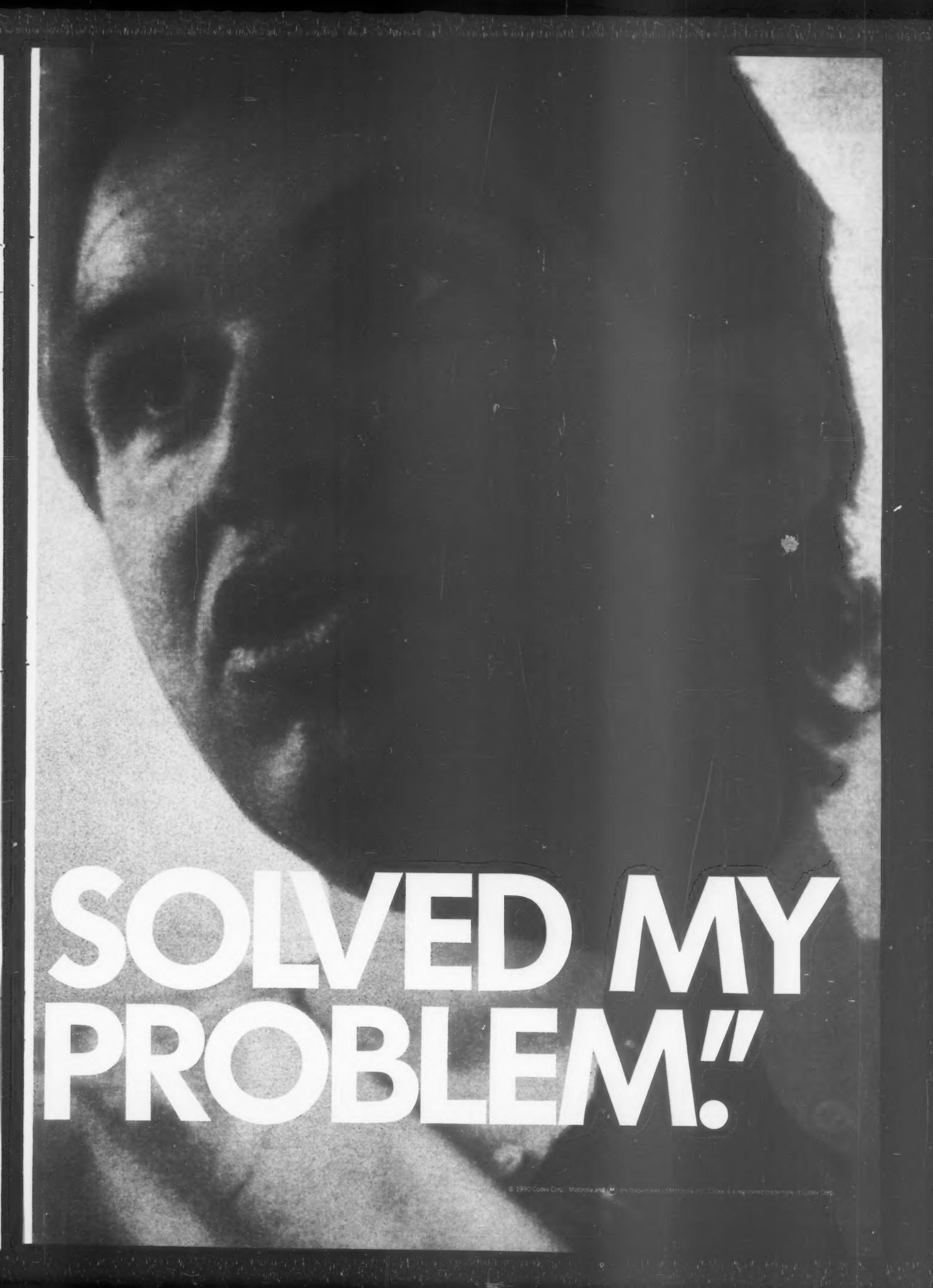
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3Com aims for open territory

BY JIM NASH
CW STAFF

SANTA CLARA, Calif. — Over at 3Com Corp., the wagon train is again changing course. Late last month, executives said they are nearing delivery of a server that they claimed will work as easily with Novell, Inc.'s Netware as their own 3+Open.

The unveiling was not unexpected. Last year, months before being crowned chief executive officer and president of 3Com, Eric Benhamou busied himself writing the outline for the Santa Clara, Calif., company to follow to a more open future.

Last month's promise that he would deliver a 3/Server 500 capable of running Novell's Netware by next spring gives more support to that outline. The question is, are 3Com employees saddling a dying horse?

A 3Com spokesperson said that 3+Open users will need to know some Netware screens and a few of the commands, but beyond that, users can use 3+Open commands to work with Netware and do not need a great deal of knowledge of Novell's products, she added.

Wall Street worries

News of the ambidextrous server and an Intel Corp. i486 upgrade board were not enough to buoy sliding Wall Street confidence.

Analyst Joe Bellace at Merrill Lynch & Co. frowned about price reductions in the firm's bread-and-butter business, Ethernet adapter boards, and his perception that 3Com is moving too slowly in smart wiring hub and internetworking markets.

For at least some users — particularly those who are migrating between Netware and LAN Manager-based operating systems such as 3Com's 3+Open — the server is clearly good news.

Toshiba America, Inc. in Irvine, Calif., is switching saddles. Now a solid Netware shop, Toshiba America is moving entirely to LAN Manager. Terry Bergman, senior personal computer coordinator at Toshiba, said he is not happy about the company's marketing decision to switch, but 3Com's server might at least ease the pain.

"Without communication between the two [operating systems], you don't have a good migration strategy," Bergman said.

Lacking a need to migrate from one system to the other, 3Com's new server, loaded with a 486 card, could enjoy a brief celebration by users in small niches.

"I'd prefer to keep it simple," said Tom Burkman, a systems analyst at Midway Airlines in

Chicago. That means that Midway, which has standardized on Netware, would be unlikely to throw a wild card like a 3Com server into its mix, Burkman said. Even if a 486 board could boost Novell's power, Burkman said he would look the other way.

"Somehow, some way, I think you might be in for trouble."

At the Fortune 100 level, 3Com might become irrelevant. Martin Sinnott at NCR Corp. said, "There's a consolidation going on. We're finding that [Microsoft Corp.'s] LAN Manager is

the preferred technology." Sinnott is director of development at NCR's workstation division.

Word of 3Com's new server "makes me a happier business person," said Bill Bailey, director of planning at Unum Life Insurance. He said he expects a "ripple effect" to bring similar interoperability to other vendors, "but personally, the task at hand is to solve problems, not

play with toys." Bailey said Unum would continue to use its IBM LAN Server, which is also based on LAN Manager.

Sinnott said Dayton, Ohio-based NCR is selling OS/2 LAN Manager, SQL Server and Communications Server — all Microsoft products — directly with its PCs. He said large companies in particular view LAN Manager as the more open system.



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Proteon shines up network hub with fiber backbone

BY JOANIE M. WEXLER
CW STAFF

Token-ring users, choose your media.

Proteon, Inc.'s recent round-

ing-out of its Series 70 intelligent wire center to support 16M bit/sec. fiber backbones allows companies to knit together their shielded or unshielded twisted-pair local-area networks and

manage the whole internetwork through the vendor's Tokenview Plus and Tokenview Manager systems.

Intelligent wire centers, also called smart hubs, have skyrocketed in popularity for logically configuring LANs of any topology within the hub and physically arranging the nodes in a star configuration. This allows a connection to each node, alleviating

network management guesswork.

Proteon is not alone: Synoptics Communications, Inc. recently enhanced its System 3000 wiring center, which originally supported Ethernet LANs over various media, with token-ring capabilities. The company last month added two new modules: one supporting 16M bit/sec. token-rings over voice-

grade unshielded twisted-pair, and one that supports 4M bit/sec. token-rings over both shielded and unshielded twisted-pair.

While Proteon purports to consider industry standards a major priority, there has been little progress by the IEEE 802.5 token-ring standards committee toward a standard for running 16M bit/sec. token-ring networks over the fiber medium. Proteon has not mentioned plans for hub support of Fiber Distributed Data Interface (FDDI), the near-complete ANSI standard for 100M bit/sec. LANs that is gradually finding acceptance.

Proteon does, however, offer an FDDI router for use by companies running the high-speed FDDI LAN as a backbone.

"The fiber support rounds out Proteon's offering, but overall, the amount of token-ring networks running over fiber is very small," commented Susan Frankel, an analyst at Framingham, Mass.-based International Data Corp.

Frankel said that in 1990, just 2% of all non-FDDI token-ring nodes will connect to fiber, adding that the percentage will grow to just 6% by 1994.

"It's not clear to me what the rationale was for not moving to FDDI as a backbone," said Kevin O'Neill, vice-president of network research and consulting at Business Research Group in Newton, Mass. "Maybe, like other vendors with investments in proprietary technologies, Proteon is holding off until FDDI becomes more accepted before cannibalizing its existing product."

Proteon has offered its proprietary ProNet-80 fiber backbone network, which runs at 80M bit/sec., since 1985.

Cost-conscious

The company said it hopes that because of many information systems managers' current budget crunches, more firms will turn to it as a lower-cost alternative to IBM, claiming that its 16M bit/sec. fiber system is about 38% cheaper than IBM's and citing its centralized token-ring management offering as an edge over its competitor. IBM announced a Token-Ring management workstation and software earlier this month.

Proteon's Tokenview Plus is a station that manages a single ring; Tokenview Manager gathers network management data from Tokenview Plus systems on multiple rings for a conglomerate picture of the interlinked network.

O'Neill said that "a number of IBM accounts will be interested in Proteon's 16M bit/sec. fiber backbone as a cost-effective way of linking their 4M bit/sec. token rings. In terms of the general market, however, there's a question mark as to its positioning."

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We're More Than Just Talk.

Booker

CONTINUED FROM PAGE 79

Imaging proponents legitimately counter that in the days before these ambitious imaging applications emerged, white-collar professionals spent far more time hunting for paper records or requesting those documents.

Earlier this year, the Police Department in Rochester, N.Y., installed a Wang Laboratories imaging system for managing the 16,000 motor vehicle accident reports it processes annually.

Response time on the Wang VS-hosted system also depends on where the images are located. "We have three scenarios for display [of images]," said

Richard Babin, manager of police information systems. "If the image is on magnetic media, typical response time is under 5 seconds . . . If it's on an optical disc and the disk is mounted in a drive in our jukebox, it's 10 to 15 seconds. The third scenario is if the image is on optical disc but not mounted [and the robotic jukebox must load it first]. That response time is 45 to 50 seconds."

Asked what would be an "acceptable" response time, Babin says 90 seconds, although he acknowledges that this wait might be thought intolerable by some people.

"I think you have to keep in mind what the manual process was like in terms of how long it took to do something, how long it took to run around or make copies

. . . and the frustration of waiting," Babin said, adding that an unanticipated benefit of the imaging application has been a dramatic boost in department morale.

However, while the local components in imaging setups have some solutions, including installation of a 100M bit/sec. Fiber Distributed Data Interface (FDDI) LAN, wide-area networking is much more problematic. At 19K bit/sec., the single image will take half a minute to shoot down the line. Even with a 64K bit/sec. pipeline, a typical image would still take just under nine seconds to transmit.

A 64K bit/sec. channel can be found in an Integrated Services Digital Network (ISDN) line, and ISDN, unfairly regarded by many as a technological stepchild, could gain some advocates if it was used

for this purpose.

The Rochester police hope to implement an ISDN Centrex connection within six to eight months, according to Babin, who said a test last week of a 94K-byte file over the single 64K bit/sec. B channel took 10 seconds. Displaying the image on a workstation will add some more delay, but Babin seems to be confident that he can get performance of less than 20 seconds.

A final networking issue is the backup of what promise to be enormous image databases. A law firm, for example, is scanning up to 10,000 pages a day, seven days a week; an engineering company has put more documents into its image database in three months than it did in 20 years of using conventional data processing.

Here again, the marketplace's growing need for bandwidth may propel local and long-distance providers to accelerate deployment of fast-packet, Sonet and broadband ISDN networks.

Meanwhile, will users wait those extra few seconds for their pictures? I'm not so sure. Even the strongest proponents of imaging will concede that this tool succeeds only when users accept it. For that to happen, users will insist on dramatic improvements over their familiar, paper-based ways of working.

I'll wager that a 20-second response time will start showing up in many customer proposal requests to vendors and that this threshold will become the maximum delay users will tolerate.

Booker is *Computerworld's* Chicago bureau chief.

NEW PRODUCTS

Network management

Sungard Recovery Services, Inc. has unveiled a disaster-recovery software package designed for users of IBM Token-Ring local-area networks.

The Sun-Net 802 T/R uses an IBM 3745 front-end processor equipped with a token-ring interface coupler to interface with a subscriber's bridging equipment to recover Token-Ring networks. The product supports 4M or 16M bit/sec. Token-Rings and communicates at a maximum speed of 1.54M bit/sec.

Pricing ranges between \$300 and \$500 per month, depending on type of contract and type of access used.

Sungard
1285 Drummers Lane
Wayne, Pa. 19087
(215) 341-8700

Triticom has announced a product designed to monitor token-ring traffic and ring errors in real time while operating within 4M bit/sec. IBM/IEEE 802.3 Token-Ring local-area networks.

Tokenvision includes four real-time monitoring display modes: station display, skyline, statistics and MAC statistics.

System requirements include an Intel Corp. 80286- or 80386-based personal computer running PC-DOS or MS-DOS Version 3.1 or higher. The product costs \$495 or \$995 with an optional 16K bit/sec. token-ring adapter.

Triticom
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MANAGER'S JOURNAL

EXECUTIVE TRACK

Glen R. Winans II has been promoted to vice-president of information systems at **Automated Training Systems (ATS)**, a Woodland Hills, Calif.-based provider of audio training services for IBM midrange computer users.

Winans was promoted from data processing manager, a position in which he managed the IS and technical support departments. As vice-president, he maintains those duties and adds responsibility for managing the research and development department.

Winans joined ATS in 1988 in the sales department. Before that, he was manager of programming for the city of Topeka, Kan., a programmer at Idaho Statesman and an operator at United Information Utilities, Inc.

The U.S. National Commission on Libraries and Information Science (NCLIS) in Washington, D.C., has named **Peter R. Young** as executive director. He has worked at the Faxon Co. in Westwood, Mass., since 1988, where he serves as director of academic information services and as director of the Faxon Institute for Advanced Studies in Scholarly and Scientific Communication.

Young, who holds a bachelor's degree from the College of Wooster in Ohio and a master's in library science from Columbia University, takes the place of John G. Lorenz, who had served as acting executive director since the departure of Susan K. Martin in June.

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any IS job changes in Executive Track. When you have news about staff changes, be sure to drop a note and photo or have your public relations department write to Clinton Wilder, Senior Editor, Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

BY GARY H. ANTHES
CW STAFF

When fire broke out on the 10th floor of a Penn Mutual Life Insurance Co. building one afternoon last year, some of the 12 million gallons of water pumped by the Philadelphia Fire Department found its way to the firm's seventh-floor data center. Although damage was extensive, Penn Mutual had put together a traditional data center recovery plan; by the following morning, computer processing had resumed at a Sungard Recovery Systems, Inc. backup site.

However, other critical business functions didn't fare so well; the fire destroyed important manual records supporting a number of insurance activities. Now, Penn Mutual and Harris Devlin Associates, a Sungard subsidiary, are putting together what has become known as a business resumption plan — a belated recognition that an organization does not live by data processing alone.

Information systems managers are increasingly being tapped by top management to develop these enterprise-wide plans, expanding the scope of disaster planning far beyond the traditional and comfortable data center boundaries. The new responsibility carries significant risks and rewards for IS managers.

Comdisco Disaster Recovery Systems, Inc. has broadened its traditional computer recovery services to include business recovery offerings. After the San Francisco earthquake last year, brokerage firm Charles Schwab and Co. took steps to move its computer processing to a Comdisco facility in

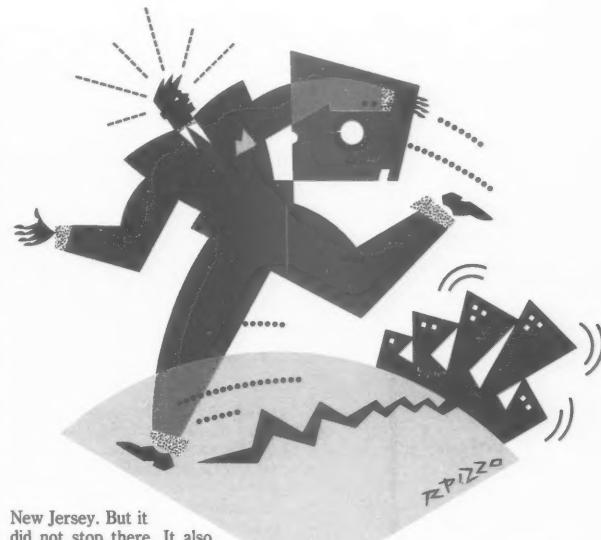
New Jersey. But it did not stop there. It also moved some critical back office operations to another Comdisco facility 20 miles north of San Francisco where Comdisco had standby offices equipped with telephones and computer workstations.

"The traditional approach assumes the tornado only affects the data center," says John Maxwell, director of membership services and technical support at the Association for Computer Operations and Management (AFCOM). "Chief financial officers are driving disaster recovery now. They're starting to realize that if they can't resume most business functions in a heartbeat, they're in trouble."

In most cases, Maxwell says, CFOs are turning to IS managers for corporatewide plans because they have the most experience with disaster planning and because they are likely to have a broad knowledge of the critical areas that depend on computer technology. Maxwell says disaster-recovery planning methods developed for computer operations can also be readily adapted to functions that are entirely manual.

Robert P. Campbell, president of Advanced Information Management, Inc., a firm specializing in information

Continued on page 94



Sound IS investment based on teamwork

BY SALLY CUSACK
CW STAFF

Quantifying money spent on information technology is often an elusive yet essential task for information systems managers, but a recent study by The Diebold Group, Inc., a New York-based management consulting firm, said there may be hope for those designated to evaluate information technology expenses and investments. The answer may lie in an approach that blends teamwork with the ability to prove both hard benefits and soft benefits from technology.

According to Diebold, analyzing information technology investments is a multidimensional issue, and productivity analysis must take place on all levels, beginning with the individual and progressing outward to incorporate the global economy. Once this premise

is established, one must identify the correlations between levels.

"This becomes more problematic as one drills down to the department, work group and individual levels," said Anthony P. DiRomualdo, associate director of Diebold Research Programs. "They are more complex, more qualitative and more fuzzy."

DiRomualdo also noted that traditional macroeconomic relationships have failed to determine a relationship between investment and productivity — a factor that has further strained the relationship between top management and IS. Aggregate measures of IS costs are more visible than aggregate measures of benefits.

For IS executives to succeed, they must develop a strategic, business-oriented view of information technology spending and investments. Based on the study, Diebold recommends the following steps:

- Combine hard quantifiable and soft nonquantifiable measures of IS costs and impacts.
- Incorporate multiple perspectives.
- Balance business and technical trade-offs.
- Link performance measures with business objectives.
- Involve both line and IS managers.

Diebold coordinates analysis between IS and line management. This "teaming approach" between IS and line management will aid in avoiding both technological and business risk, the report states, while the justification processes must address both the business and technology domains.

According to DiRomualdo, possibly the most critical issue revolves around the fact that a companywide perspective of information technology is lacking in many companies. "Executives must be proactive in correcting this situation," he concludes.

Recovery

FROM PAGE 93

security, says an outdated but still dominant notion is that the IS manager can arrange for off-site data storage, sign a contract with a backup processing firm and then declare planning done. "Now, senior management is changing MIS' charter, and many IS managers will be surprised to find out [recovery planning] includes all corporate functions," he says.

Irving Pollack, manager of IS at Credit Lyonnais' U.S. headquarters in New York, says he "nagged" top management several years ago to let him develop a bankwide plan. It paid off. When the lights went out in low-

er Manhattan last month, the bank moved 100 people to a Comdisco hot site in New Jersey where the bank had contracted for computer capacity and 9,000 square feet of office space [CW, Aug. 20].

Pollack says all but two of 35 data processing and back-office functions, previously identified as critical in the recovery plan, were restored within six hours.

IS hitch could mean business disaster

Percent of respondents (Base: 160)

Functional area	Dependence on computer support			
	Total	Heavy	Moderate	Slight
Accounting	29%	60%	8%	3%
Finance	13%	56%	23%	9%
Personnel & administration	6%	41%	28%	26%
Sales & marketing	10%	41%	29%	20%
Inventory & distribution	25%	47%	15%	13%
Production (goods & services)	19%	45%	19%	17%
Overall dependence on computing	19%	66%	14%	1%

Source: Center for Research on Information Systems, University of Texas at Arlington

"We could have done it even quicker, but our truck overturned in the Lincoln Tunnel on the way [to the hot site]. It's the only thing we didn't plan for."

There are risks for IS managers in taking on this expanded role, including the danger that they will underestimate the magnitude of what has to be done. "The IS manager may just see it as data center warmed

Build a strong case

What if your CEO has not asked you to do the business resumption plan?

Robert P. Campbell, president of Advanced Information Management, Inc., says IS managers must lobby for top management support for business resumption planning if that support is lacking. This can be done in part by citing government regulations, especially in industries such as banking, and by recounting horror stories of others' disasters.

However, the problem with these negative motivators is that they are short-lived. The most effective tool is the ability to build a strong business case for comprehensive plans, Campbell says.

Campbell uses a method by which business functions are identified and analyzed in terms of the impact their loss would have, over time, on the company's ability to do business, its revenue stream, its expenses and its overall reputation.

Once management approves an approach, get going on it, Campbell says. "If you can't get something done in six months, interest of top management flags."

Dan Galloway at First American Bankshares advises the IS manager to get outside help for the job. "The general business areas have difficult requirements. Besides, that will get you more credibility with top management."

GARY ANTHES

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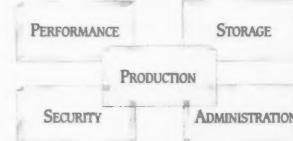
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over," Campbell says. "With the data center, he can focus on just one entity. Now he may have to have 50 plans, each unique. And he has to understand the business functions."

But there are rewards, too. "The chief information executive starts to gain substantially in stature because he's been pushed into all levels of business and gained visibility at the high-

est levels of management," Campbell says.

Dan Galloway, manager of project and technical management at First American Bankshares, Inc., a seven-bank holding company based in Washington, D.C., is putting together a recovery plan for the banks that extends an existing data center plan to critical business functions outside of data processing.

Galloway agrees that his position, just two levels below that of chairman, is a reflection of the importance of the business recovery planning function. "It's deserving of a relatively senior position," he says.

To Maxwell, the obvious risk in planning is that the plans may fail when needed in an emergency. "You can't just develop a plan, you have to test it," he

says. "Any plan not tested on a regular basis has a 60% chance of failure."

Maxwell once headed computer security at a publishing firm, and one Saturday he decided to test part of the company's plan by telephoning the key managers responsible for executing disaster recovery. Not one person could be reached, and as a result, they now wear beepers on

weekends, he says.

Eighty-five percent of 160 respondents to a 1987 survey by the Center for Research on Information Systems at the University of Texas at Arlington said they were totally or heavily dependent on computer systems. But only 63% reported having disaster recovery plans, and of those, 39% said they had never tested their plans.

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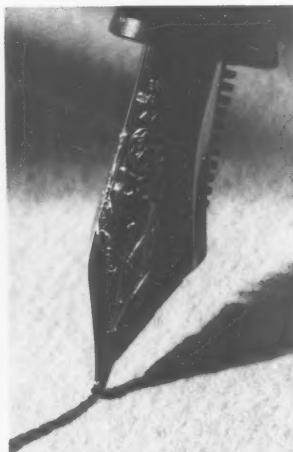
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Look at the other guy

BY CLINTON WILDER
CW STAFF

ST. LOUIS — Want to convince your company's senior executives that you are making effective use of information systems? Try telling them what your competitors are doing.

Tom Lutz, vice-president and chief information officer at Armco Advanced Materials Corp., uses that approach with his senior management team.

Lutz shared his strategy with attendees at the recent Enterprisewide Information Management Conference sponsored by the Center for the Study of Data Processing at Washington University in St. Louis.

"Our customers compare the quality of our steel to that of Nippon Steel and Kawasaki Steel [Corp.], so why not compare IS?" Lutz asked.

Information exchange

But wait, you say. That is proprietary information that we could never find out. Right? Not so, Lutz said. In many cases, competitors can be surprisingly open about sharing IS success stories.

Lutz has formed an "information exchange" with some firms in the steel business. "It works well, and it's not collusion," he said. Beyond that, much data about competitors' use of IS can be found in the public domain.

Lutz said that too often, IS departments judge themselves only by internal performance measurements, while the only business measure that really counts is competing in the marketplace. A performance report rating IS on that basis earns a lot of credibility with senior management, he said.

"I was able to show that we developed a system in less than a year that took one of our competitors six years," Lutz said. "That really meant something."

IS executives should think of their role as empowering line managers to do their jobs better with IS, according to Lutz.

"After the system is up, who is accountable for realizing the benefits of the system? It has to be the line managers," he said. "Our job is to make every business function head into a hero."

Finding a Gameplan to help IS

BY JOHANNA AMBROSIO
CW STAFF

If you are tired of playing games with your employees, do not read this. However, if you are willing to give it another shot, there is one game said to help information systems departments improve relationships with end users and upper management.

Called Gameplan, the software combines expert systems technology and simulation to help IS staff members figure out how to introduce new technology into their organization most effectively. It takes the form of a game in which IS department employees win and lose points depending on their strategies. At the end, the game promotes or demotes players depending on their performance.

IS managers who have tried Gameplan said it works for them. "It helps us look at various options to help our end users

achieve their business plans," said Kees Vreugdenhil, IS director at Union Gas Ltd. in Chatham, Ont.

The company brought in Gameplan about one year ago. Since then, about 60 IS staff members and 10 end users have played the game. "Before we approach user departments about a new project they requested or we thought of, sometimes we use the software to help us anticipate what to expect," Vreugdenhil said.

Gameplan was developed and is sold by consulting firm N. Dean Meyer and Associates, Inc. in Ridgefield, Conn. Originally

released for sale in 1987, Version 3.0 recently became available. Gameplan runs on personal computers under DOS and is priced at \$695.

When the game begins, the players define the corporate culture of their particular organization. Then, based on that culture, the game takes the players through a simulation in which they figure out how to introduce end-user computing into that organization. As the players continue, they choose different options such as forming a steering committee or publishing a strategic plan, for example.

Although end-user computing is used as the model, Dean Meyer spokesman said that the principles apply to introducing any new technology.

Richard Quillin, IS manager for the city

of Albuquerque, N.M., said his department uses Gameplan as a training tool. "It helps people who are technical understand the political process of introducing technology," he said. "It's a good tool."

However, it is not the kind of thing that can be used on a weekly or even a monthly basis, IS managers agreed. "If you do it too often, you learn how to beat the system," said William Heuser, vice-president of information services at the New York City Transit Authority.

"But Gameplan makes it very obvious that you need to think about how new initiatives are brought up to management, and the people who participate bring back a much better understanding of how they all work," Heuser added. "It shows you how your co-workers think."

CALENDAR

OCT. 7-13

Pacific Northwest Software Quality Conference. Portland, Ore., Oct. 7-9 — Contact: Terri Moore, Pacific Agenda, Portland, Ore. (503) 223-8633.

Fox Developer Conference. Toledo, Ohio, Oct. 7-10 — Contact: Fox Software, Perrysburg, Ohio (419) 874-0162.

Making CASE Work. Scottsdale, Ariz., Oct. 8-10 — Contact: CASE Research Corp., Bellevue, Wash. (206) 453-9900.

Eastern Exposition and Conference. Alexandria, Va., Oct. 8-10 — Contact: The American Public Communications Council of the North American Telecommunications Association, Washington, D.C. (800) 538-6282.

National Communications Forum. Chicago, Oct. 8-10 — Contact: National Communications Forum, Chicago, Ill. (312) 938-3500.

Southeastern Telecommunications Association Conference and Equipment Exposition. Miami Beach, Fla., Oct. 8-10 — Contact: SETA, Columbia, S.C. (803) 731-5640.

American Production and Inventory Control Society International Conference and Exposition. New Orleans, Oct. 8-12 — Contact: APICS, Falls Church, Va. (703) 237-8585.

Interop '90. San Jose, Calif., Oct. 8-12 — Contact: Interop, Inc., Mountain View, Calif. (415) 941-3399, ext. 200.

CASE World Conference and Exposition. Chicago, Oct. 9-11 — Contact: Digital Consulting Group, Andover, Mass. (508) 470-3880.

Northcon '90. Seattle, Oct. 9-11 — Contact: Northcon, Los Angeles, Calif. (213) 641-5117.

Executive Information Systems in Government. Washington, D.C., Oct. 9-12 — Contact: Conference Manager, USPDI, Inc., Silver Spring, Md. (301) 445-4400.

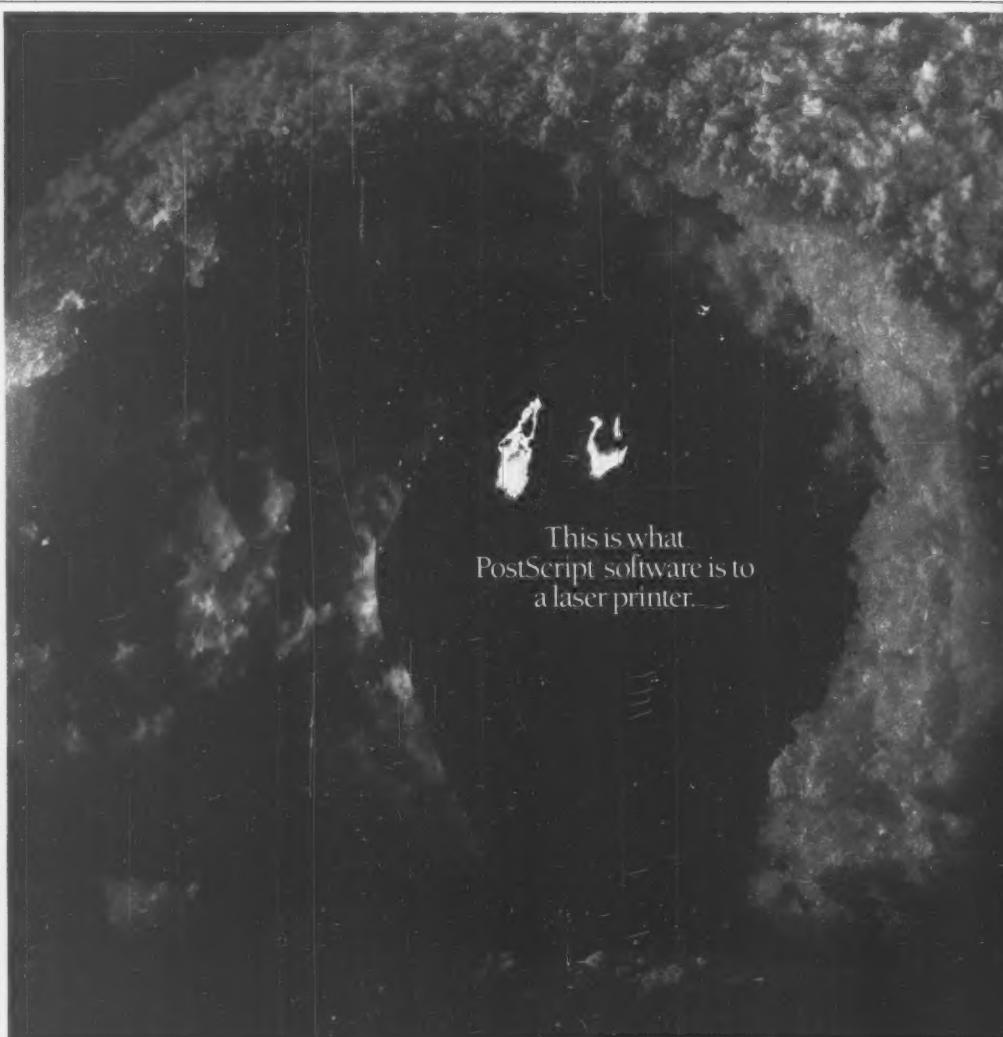
Computer Negotiations. New York, Oct. 10-11 — Contact: International Computer Negotiations, Inc., Winter Park, Fla. (407) 740-0700.

Imaging '90 Conference and Exposition. New York, Oct. 10-12 — Contact: Michelle Gracyk, BIS CAP International, Inc., Norwell, Mass. (617) 983-9130.

Info '90, International Information Management Exposition & Conference. New York, Oct. 10-12 — Contact: Cahners Exposition Group, Stamford, Conn. (203) 352-8477.

Microprocessor Forum. San Francisco, Oct. 10-11 — Contact: Microprocessor Report, Sebastopol, Calif. (707) 823-4004.

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CLIPS



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"The computer speed barrier"

By Michael Leibowitz

Technology Review
Aug./Sept. 1990

■ For every 11 inches a computer signal travels, one-billionth of a second is lost. High-performance workstations, minicomputers and mainframes have become so fast that distances separating chips — not the chips themselves — can be a major bottleneck.

That is why researchers are hot on the trail of interconnection technology, the study of how to pack integrated circuits together to minimize the path that electrical signals must travel. Approaches include the following:

- **Multipchip modules.** Multipchip modules compress the capabilities of four 12-sq-in. printed circuit board assemblies into a single 5-sq-in. module. The modules contain ultrafine conductive lines that compactly link several dozen microchips.

- **Wafer-scale integration.** In conventional chip making, 40 or more microchips are cut out of a single 6-in. silicon wafer. In wafer scale, the disk is never cut up, and connections between microchips are made directly on the wafer. One company is selling a pair of 6-in. wafers that together offers 40M bytes of memory.

Wafer scale nearly eliminates excess space and the handling of individual microchips but has been hampered by its inability to isolate defective chips that occur on a silicon wafer.

- **Z-plane technology.** Z-plane stacks chips on top of each other, with conductive lines running up the sides of the stack. A z-plane can hold 20 to 100 chips, packing 40M bytes of memory in a space the size of two sugar cubes.

"Informal technology transfer between companies: Information leakage or know-how trading?"

By Stephan Schrader

MIT

Working paper, May 1989

■ It is well known that employees of firms in the same industry often share technical information — whether at conferences or in a legendary Silicon Valley bar. But the notion that this information exchange is a kind of dangerous "information leakage" must be rejected.

What employees are really engaging in is "know-how trading," a practice that winds up benefiting the companies involved, according to a study of 294 technical managers in the steel industry. The managers provide technical information with the expectation of getting some beneficial information in return.

The study suggests that the economic performance of companies allowing this informal information exchange is higher, not lower, because know-how trading prevents redundant research activities.

To this end, technical managers readily share cost-saving ideas but avoid leaking information to their strongest competitors, especially quality information that could result in a competitor having a better product.

"The chief technology officer"By Paul S. Adler
and Kasra FerdowsCalifornia Management Review
Spring 1990

■ The title of chief technology officer has been creeping its way into the ranks of senior corporate management at a number of large corporations. Unlike its close equivalent, vice-president of research and development, a chief technology officer is considered to be the senior executive for all technical matters. He plays an integrating role among product, production process and information technology.

In companies that have chief technology officers, there were several common factors behind the creation of such a position. Companies said they wanted better control over R&D efforts, the ability to bring the technological base and top management together, better overall leadership and congruity among separate business units.

Specific responsibilities usually include the following:

- Coordinating technology among different business units, avoiding duplication of tasks and assisting and ensuring the transfer of information.
- Keeping corporate management abreast of developments.
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- Managing those activities performed by outside organizations such as universities and regulatory agencies.

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PRODUCT SPOTLIGHT

MAINFRAMES

Buying one today is a different game

BY ALLAN BAUMGARTNER

It used to be that a mainframe was a mainframe was a mainframe. If it said "mainframe" on the box, you'd set it up as a stand-alone system to store many millions of instructions per second (MIPS) of data and churn out batch processing applications. The choice of which machine to buy was fairly straightforward, dependent mostly on power capabilities and available software.

Today, data center managers often have other things in mind for these machines. Even corporations that have not yet begun to think in terms of future computing architectures know that mainframes do not necessarily have to operate as application islands. They know that these machines will be increasingly woven into the overall fabric of the enterprise.

While most purchasing decisions are still straightforward upgrades from older models, newer usage scenarios, including distributed and cooperative processing or a client/server model, are starting to change the evaluation process, adding weight to considerations such as corporate culture and connectivity.

What is important to buyers is that as the game plan changes, so does the selection strategy.

Field service

When you think of a dedicated departmental server, what might immediately spring to mind is a minicomputer or an Intel Corp. 80386- or 1486-based personal computer or workstation on a local-area network. However, data-intensive departmental applications are starting to overwhelm the I/O capabilities of many LAN servers.

What mainframes bring to the picture are database facilities that enable users to construct data-intensive applications with relative ease. While it usually requires a confident innovator to

Baumgartner is president of International Computer Contracting Corp., a San Jose, Calif.-based computer and communications marketing firm specializing in the acquisition, installation and service of large computer systems.

step up to a mainframe departmental platform, no-nonsense software and the availability of plug-and-play databases attract managers leery of LAN limitations.

To start your evaluation of mainframes for a departmental

ing to spend.

When choosing a hardware environment, it is best to look at what software the vendor has to offer. Specialized providers offer departmental platforms and applications: For example, Control Data Corp. is the place to turn

operators for a department's application. Unisys Corp. can point out a diversity of applications, particularly in hospitality, government, banking and airlines.

There is already a long list of value-added resellers that offer midrange business applications to high-end IBM Application System/400 models; however, a new breed is also starting to port corporate departmental applications to this platform.

You may also want to consider a used mainframe. It will cost less and be many times as powerful as the most powerful workstation server. However, many used machines are not installer-friendly, and the software comes without vendor support.

In IBM shops, if you need to downsize and regain control in a hurry, the accepted technique is to extract an existing application out of the IBM 370 corporate processor and install it on a departmental IBM 9370 machine.

OLTP joins the fray

Ever since the CICS operating system was developed 10 years ago, most production systems have been built on the on-line transaction processing (OLTP) model. Competition is fierce in this arena, producing an excellent selection of OLTP software and hardware from Digital Equipment Corp., Unisys, Bull HN, Tandem, IBM and others.

When approaching the evaluation of OLTP machines, it is best to throw out the old rules of selecting the application first. The enterprise's entire cooperative processing strategy needs to be considered along with the application software. This is because there is more at stake than just the machine running the application.

Other considerations also enter the picture: whether the users will work on terminals or workstations, whether the mainframe or workstation will present the transaction; where the database data will reside; whether the database software will manage the anticipated size of the database; how long it will take to develop the application; how many programmers it will require; the project schedule;



application, you will first need to determine how much of the application development work you are willing to manage yourself, what is available in the way of off-the-shelf application software and how much you are will-

for engineering, and Tandem Computers, Inc. offers nonstop, or fault-tolerant, applications. For government applications, check out Bull HN Information Systems, Inc.'s products.

Less-specialized mainframe vendors will help customers find experienced value-added develop-

INSIDE

Past and Future

What has been and what is yet to come. Pages 102, 103.

Buyers' Scorecard

User reviews of top-selling 3090-size systems. Page 106.

Recent Releases

A guide to mainframes shipped 1988 through 1990. Page 110.

and projected cost.

Together, the choice of application software and cooperative processing environment should drive the choice of mainframe architecture. Two important capabilities — database hardware assistance and relational logic analysis — are starting to appear on Hitachi machines in Japan, and with its in-line database analysis offered on the Enterprise System/9000 line, IBM is starting to offer these capabilities as well.

If you need to combine ad hoc queries for research and development with the OLTP production environment, it is important to choose one of the recent systems based on relational databases. On traditional systems, ad hoc queries are usually excluded from the OLTP production environment because they require system resources. These more recent systems have mitigated this restriction.

If yours is a new OLTP application, programmer productivity is paramount. Hence, you may want to consider an easy-to-use development environment.

Nearly all of the non-370 architectures have a clear advantage in this arena. These architectures offer slightly less costly hardware and less costly system software and are much less com-

plex. The keep-it-simple focus enables users to develop applications much faster, with fewer human resources. Likewise, fewer systems software specialists are needed, and users can adapt and evolve the system quickly. Some studies have suggested that overall human productivity may show as much as an order of magnitude improvement outside the IBM 370 environment.

Client/server mainframes

OLTP models were the predecessor for the client/server model. Traditionally, mainframes optimized for OLTP answered predefined formatted queries. On-line queries are now being preprocessed at the front end by workstations before being passed on to a mainframe data-base server.

As in choosing a machine for OLTP applications, it is necessary to have a complete picture of the prospective client/server architecture before choosing a mainframe. You need to ensure that all the system's components can either be acquired or fabricated.

Users will want to evaluate the workstation presentation software in conjunction with the database access tools. The prevalent practice calls for the presentation software to translate

"Year in review"

Arrivals and intros:

- Tandem, Stratus roll out competing systems they claim are the first to target fault-tolerant on-line transaction processing (October 1989, April 1990)
- DEC turns mainframe vendor with 512M-byte VAX 9000 debut (October 1989)
- IBM begins shipping 3090J series with modest performance increase (October 1989)
- HDS pulls ahead in speed race against IBM and Amdahl with 150-MIPS processor (June 1990)
- NEC takes lead with machine capable of 500 MIPS in scientific calculations (July 1990)
- Unisys announces the A16, the first mainframe based on Motorola's bipolar logic chip (July 1990)
- Fujitsu triples power of current high-end model, outmuscling HDS' machine by 10% and beating IBM to high-end punch. The new engine is expected to also be used in Amdahl's future "Eagle" machine (September 1990)
- IBM announces long-awaited ES/9000, with five fiber-optic machines shipping immediately, other capabilities to follow (September 1990)

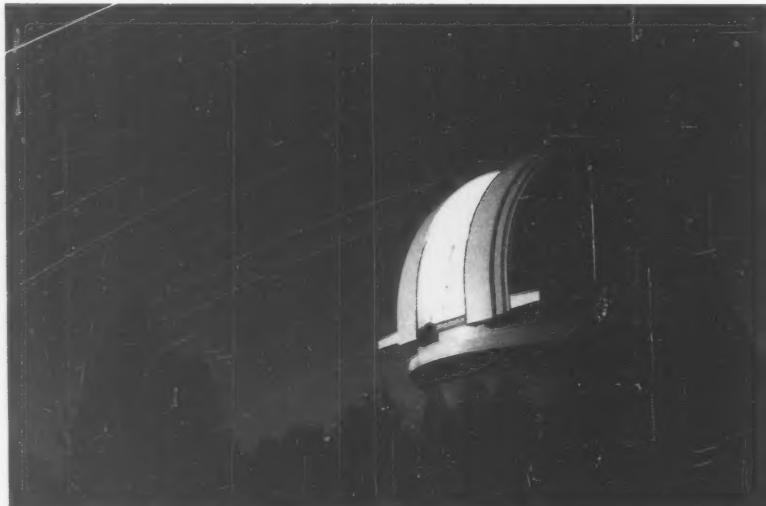
Discounts and deals:

- IBM announces various across-the-board price hikes but makes exceptions for many products (March, August 1990)
- IBM customers reportedly receive discounts of up to 50% on 370 architecture systems and software as IBM tries to appease current user base waiting for 3090 follow-on. IBM also offers up-front discounts on next-generation "J Prime" machines (June 1990)
- Bogged down by delays in shipping the VAX 9000, DEC takes a cue from IBM, offering customers special deals such as loaner machines and discounting (July 1990)

Stated strategies:

- IBM steps out of character and outlines its next-generation strategy. Its new mainframes will have processors dedicated to specific operations such as database management, data sorting and security (August 1990)
- HDS sets out to revise and publish leasing policies regarding recertification of equipment, maintenance and reconfiguration (September 1990)
- IBM offers incentive program for ES/9000 upgrades, especially for 3090 E customers upgrading to J models. Only J models are upgradable to the ES/9000 (September 1990)

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With its 200-inch telescope, one of the largest in the world, Mount Palomar Observatory can focus on stars not visible to the naked eye.

"Year to come"

Arrivals and intros:

- IBM expected to fill in capabilities announced with ES/9000 debut. Features include dedicated processors that are specialized to run database management, data sorting and security; enterprisewide data access; functional connectivity; initial clustering for OLTP; fiber-optic channels; and CMOS technology
- HDS expected to deliver its high-end machine with fiber-optic channels. Will also announce price/performance improvements on EX line to compete with ES/9000
- Amdahl expected to announce future strategies for next-generation "Eagle" machine as well as enhancements to existing 3990s. Machine specifications expected to closely resemble the new Fujitsu machine

Discounts and deals:

- Customers anticipate continued deals and altered pricing structures on 3990s and used equipment as a result of ES/9000 announcement

Stated strategies:

- IBM claims it will roll back some of the discounting that occurred in the past year, apparently attempting to taper price wars. Whether customers will accept this is not yet known, because they have become accustomed to IBM price flexibility
- Since both HDS and IBM have announced next-generation machines and offered attractive "transitions" for their installed bases, competition will reach a high point. All mainframe vendors will strive for "account control" within their individual installed bases

Forecast information provided by Framingham, Mass.-based market research firm Technology Investment Strategies

CW Chart: Paul Mock

the transaction into one or more asynchronous SQL queries for the mainframe to process.

The mainframe plays the role of a data vault. Its important attributes are an efficient database service, extensive communications access for large numbers of users, a secure operating system and intensive disk I/O.

MIPS, on the other hand, are irrelevant. Instead, SQL queries are the appropriate measure for comparison, and most vendors can produce their latest SQL benchmarks. In the very special case of large databases with linear indexes, such as phone numbers, names and license plates, the Tandem Cyclone has a reputation rivaling IBM's.

For connectivity concerns, all mainframes offer excellent communications transport hardware and software, which communications designers can connect with your enterprise's networks.

Communications software interlocking at the transaction level is the difficult question and should be a factor in your evaluation. Prospective mainframe vendors can help with both proprietary and open systems software.

While the ideal server is not yet available, IBM and the plug-compatible manufacturers (PCM) now imply that IBM

mainframes and the PCMs' hardware structures should eventually include a traditional von Neumann dispatcher, a parallel database processor backed by intelligent semiconductor storage, which is in turn backed by parallel disk access. This should be intelligently cached to answer most requests for data from silicon.

Until these machines are delivered, it makes sense to anticipate their availability and standardize on basic SQL database access.

Sharing the wealth

Distributed applications come closest to users' vision of cooperative processing, where multiple databases and their underlying platforms are integrated to work together.

IBM's Systems Application Architecture is the best-known environment, and every mainframe vendor is rushing to develop its own proprietary cooperative processing solution. Real products to evaluate and test, however, are not so easy to come by. The choices consist of making your own or trusting your vendor.

Applications that cannot be moved off the mainframe include the following, according to 50 IS directors at Fortune 500 firms surveyed by The Sierra Group, Inc.:

- Financial reporting, payroll.
- Human resources applications.
- Order processing.
- Applications requiring worldwide, enterprise networking.
- Corporate switching software.
- Automated teller machine and main bank applications.
- Heavy-duty account processing.
- Big number crunching.
- DB2 database programs.

Essential management tools for system designers are the database and dictionary, distributed database and repository.

Clearly the mainframe choice is secondary to the underlying system software environment. Several database vendors, including IBM, are designing on the customer's blackboard — promoting dual database and two-phase commit — while alpha-testing prototypes.

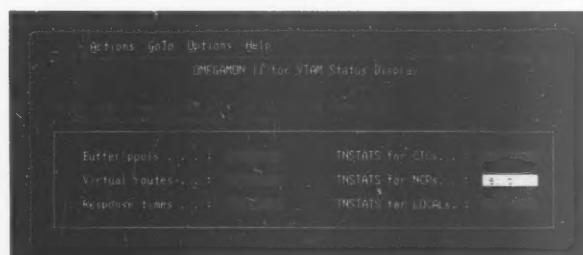
Some vendors can offer development tool sets, while others are content to emphasize connectivity. At least one vendor — Unisys — can point to a demonstration distributed database managed under the

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cover of its MCP operating system. Drastically reduced high-speed communications costs and relational databases have made demonstration distributed databases an alternative to consider.

Today, all mainframes have impressive communications capabilities, and what doesn't plug together is readily converted in a black box.

The real communications challenge is in the application-to-application, database-to-database software pipe. Peer-to-peer and two-phase commit are capabilities you will be looking for if you choose to develop your own distributed applications.



At colossal corporations with centralized computing, the architectural possibilities are diminished. A colossal data center is one that processes more than 500 MIPS capacity and supports more than 10 data centers.

In this environment, information systems managers seek to contain the necessary enterprise data in as few holding tanks as possible. This procedure results in relatively few IS installations, a demand for the largest machines on the market and a minimal need for departmental data processing.

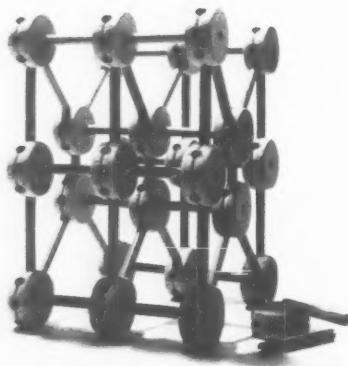
These firms require the largest available database, the largest storage engine

and confidence in an infinite growth path. Usually, they turn to the latest and largest IBM processor.

While there are advantages to centralized processing, such as application and database integration, efficiency, accuracy, fewer operations personnel and lower costs, there are negatives to consider as well. These include vulnerability, systems software complexity, communications costs and a ceiling on growth.

Whether it is a plan committed to paper or a less formal sense of future computing, data centers are looking to cooperative processing to do away with these negatives. The evaluation procedure will become only more interesting as more vendors arrive with products that back up their stated plans. •

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M E R I D I A N

T E C H N O L O G Y L E A S I N G S E R V I C E S

What next?

Studies say it, the press says it, and now, even IBM is saying it: The functions mainframes have traditionally performed are vastly different from what these machines will be doing in the future. As a result, mainframes will start to offer functionality never before found on these machines, such as dedicated processors, fiber-optic cabling, better connectivity and OLTP clustering capabilities.

Does this jibe with the users' version of the story? We asked IS managers how they are using their current mainframes and how their evaluation process will change in their next mainframe purchase.

Richard Lester
Vice-President of IS
Associated Grocers, Inc.
Seattle

— **Current mainframe:** "We use a Hitachi XL 80 for all our business applications, including inventory management, billing and electronic services for our customers such as scanning, E-mail and electronic payment processing."

— **Planned purchase:** "We upgraded from the XL 60, which we purchased in 1987, to an XL 80 this year, so we won't be buying another mainframe for a few years. However, the most important features spurring the decision to buy a new mainframe would be a significantly improved price/performance ratio.

Also, fiber-optic channels would be great. Any large operation has a web of cables under the floor, so a smaller mass of wiring to handle would make maintenance of the data center that much easier.

Another important feature is faster channels, something reaching 6M bits or beyond, if that's ever available.

The No. 1 consideration we have, though, is reliability and service from the vendor."

Michael Kelly
Vice-President of MIS
Chicago Mercantile
Exchange, Inc.
Chicago

— **Current mainframe:** "We recently installed our second IBM 3090J series, and we also have Tandem's Nonstop Cyclone. The IBM is used for all the clearing functions, RISC functions, regulatory functions and exchange administration. On the Tandem, we run order reporting, price reporting and price ticketing."

— **Planned purchase:** "Price/performance is probably the most important thing. We will probably migrate toward the new Tandem

Continued on page 109

New methods to look at the conventional buy

BY ALLAN BAUMGARTNER

People will always buy mainframes for conventional uses, such as batch processing applications and upgrading an old model when it runs out of capacity.

Batch processing may be considered archaic, but the need for answers to large data and computational problems continues to this day. In fact, our appetite for solutions to larger problems — and ones with greater precision — is growing.

Conventional batch processing presumes extensive data processing and calls for inexpensive millions of instructions per second and massive I/O. Price/performance is also important, suggesting systems from Bull

Selecting an upgradable vs. a nonupgradable model is a significant factor when purchasing a used IBM machine. The majority of machines bought and sold are no longer upgradable to IBM's newest models in the 3090J series. Since 3090s have been

around for a long time, however, many of the upgradable models are available from independent brokers and lessors.

While IBM has always guaranteed its used machines, the PCMs such as Hitachi and NCR Corp. charge outrageous prices

to recertify machines. In addition, complex mainframes require technical expertise — from either the manufacturer or an independent firm — that is available for a price. Both of these factors can reduce resale values and increase the cost of

acquiring a used mainframe.

In general, the opportunity for acquiring non-IBM equipment is improving rapidly as IBM's competitors recognize the turf they have ceded to IBM. Hitachi recently announced that it is redoing its used-machine policies, and sales of used non-IBM machines are expected to surge during the next few years. •

NEARLY HALF of all mainframes purchased are used, and most of these — \$5 billion worth in the U.S. — are from IBM.

HN Information Systems, Inc., the plug-compatible mainframe (PCM) processors from Amdahl Corp. and Hitachi America Ltd., as well as older, used mainframes.

The great majority of all mainframe acquisitions are driven by growth and the need for more of the same type of capacity. But even in upgrading, the rules have been altered somewhat. All high-end mainframes can now be enlarged by adding additional processing units — a practice known as clustering.

In cluster formations, the operating system presents a single image to the application. Therefore, users evaluating clustered mainframes need to compare their capacity forecast with the operating system and mainframe combination.

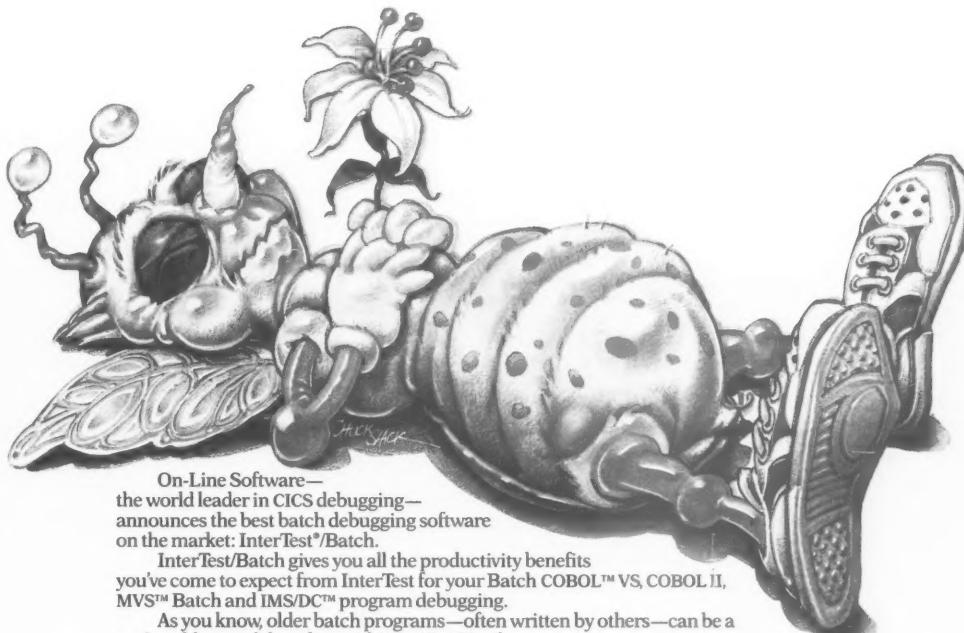
To prevent users from achieving capacities with clustering beyond what they themselves offer, manufacturers prohibit certain combinations or discourage users from choosing them through high pricing.

Used merchandise

If no new functions are needed, batch processing and upgrade candidates can consider a used machine. Evaluation of these machines is almost purely a price/performance comparison after space and operating systems compatibility requirements are met.

Nearly half of all mainframes purchased are used, and most of these — \$5 billion worth in the U.S. — are from IBM.

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BUYERS' SCORECARD

Amdahl, Hitachi top mainframe matchup

BY MICHAEL L.
SULLIVAN-TRAINOR
CW STAFF

There are a few things you can count on in life. Jerry Rice catching a long bomb from Joe Montana. Roger Clemens striking out the side in at least one inning. Jose Canseco slugging a pitch out of the park.

Now add Amdahl Corp.'s 5890 and Hitachi Data Systems Corp.'s EX 80 mainframes to the list. Users of the two systems gave them the highest reliability ratings (9.6 out of 10) and the highest scores overall in the Buyers' Scorecard survey of more than 100 users of mainframes from the top five vendors.

The survey compared ratings from users of IBM's 3090 200J (30 respondents) and Amdahl's 5890 300E (30 respondents), Hitachi's EX 80 (16 respondents), Unisys Corp.'s 2200-633 and A/17 (12 respondents) and Bull HN Information Systems, Inc.'s DPS 90-92/93 (20 respondents). Scores are derived by multiplying the ratings each user group gave its own product by the importance factors all users assigned to the 13 criteria. (See methodology next page.)

Despite its dominance in the market, IBM's 3090 scored fourth in the overall ratings and finished last in significant areas such as capacity, memory access time and cost.

"IBM is the market leader, and the 3090 is reliable," says Susan Gannon, high-end systems analyst at Technology Investment Strategies Corp. in Framingham, Mass. "It offers compet-

itive price/performance but not always the best price/performance."

Users' concerns about price and performance may have been intensified during the time of the survey because of announcements from the major vendors about their next-generation mainframes. For example, the new features of IBM's Enterprise System/9000 machines make current 3090s less attractive and focus buyers' attention on the cost per million of instructions per second, Gannon says.

Amdahl and Hitachi users surveyed rated the two mainframes highest in performance (9.3 out of 10 for both), while Amdahl (8.6) edged slightly ahead of Hitachi (8.5) and the rest of the pack (a full 1.5 points behind) in ratings of cost per processing cycle.

"The 5890 is not as quick as the 3090, but it is very reliable, and the overall performance is excellent," says Jeff Tucker, operations manager at Affiliated Computer Systems Corp. in Dallas.

Users marked reliability, overall performance and compatibility with installed hardware as the most important areas of the 15 factors measured. Amdahl topped compatibility, followed by IBM and Hitachi in a second-place tie.

The Unisys and Bull mainframes received high ratings in three areas. Unisys tied for second with Hitachi in providing sufficient capacity. Bull captured second in efficient memory access and cache performance.

The lowest rating overall went to Bull (6.7) for efficient environmental controls. IBM scored lowest (7.1) in acquisition and maintenance costs. •



Mainframes

Total scores reflect all criteria and their user-assigned importance. Response base: 30 users per product for IBM and Amdahl, 20 for Bull HN Information Systems, 16 for Hitachi and 12 for Unisys

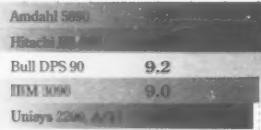
Product	Three highest ratings	Three lowest ratings
Amdahl Corp.'s 5890 300E	Reliability Overall performance Compatibility with installed systems	Cache performance Environmental controls Floor-space requirements
Hitachi Data Systems Corp.'s EX 80	Reliability Floor-space requirements Overall performance	Networking support Acquisition/maintenance cost Cache performance
Unisys Corp.'s 2200 633, A/17	Reliability Ease of operation Overall performance	Networking support Acquisition/maintenance cost I/O channel control
IBM's 3090 200J	Reliability Compatibility with installed systems Service and support	Acquisition/maintenance cost Floor-space requirements Cost per cycle
Bull HN Information Systems, Inc.'s DPS 90-92/93	Reliability Overall performance Ease of operation	Environmental controls Networking support Acquisition/maintenance cost

KEY RATINGS

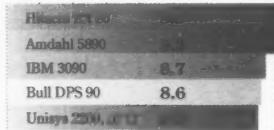
Amdahl 5890 tops three of six key ratings by very slim margins and ties with Hitachi's EX 80 for the two most important factors to users: reliability and overall performance. IBM comes close to the top in service and compatibility, its two areas of traditional strength

User importance rating:

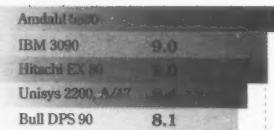
9.7 Reliability



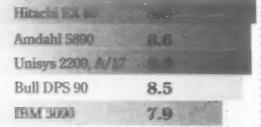
9.0 Overall performance



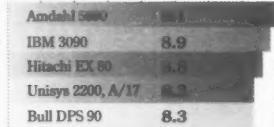
9.0 Compatibility with other installed hardware



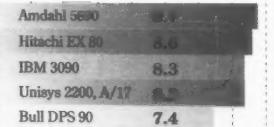
8.9 Sufficient capacity



8.8 Quality of service & technical support



8.7 Efficient I/O performance

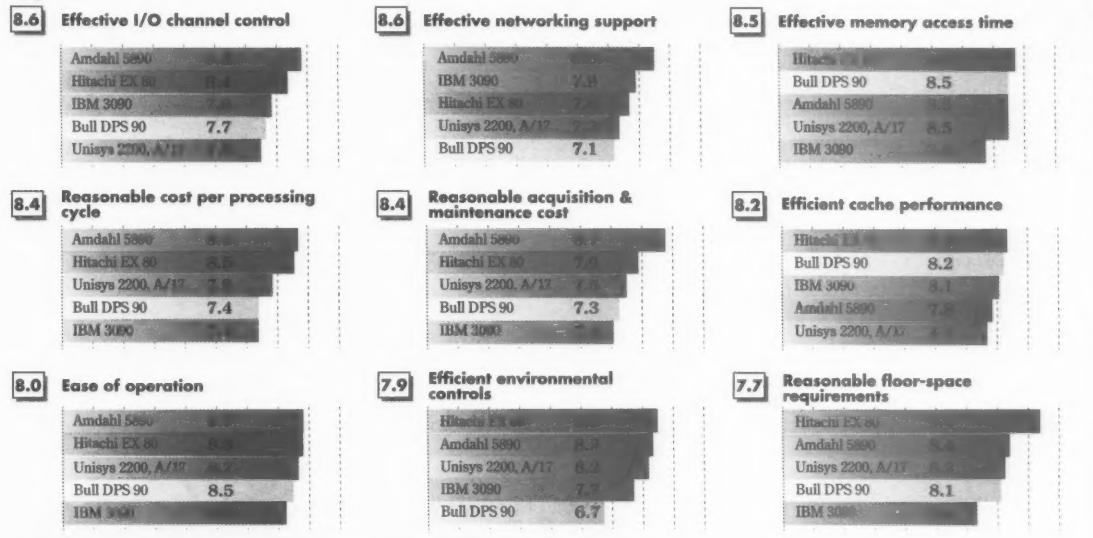


CW Charts: Doreen Dahl

A CLOSER LOOK

Bull HN's systems near the top in memory access time and cache performance but score low in most other criteria. Unisys' mainframes score in the middle-to-low range across the board

User importance rating:

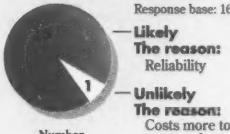


Loyalties

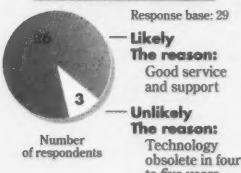
Would you buy the product again?

(Reasons based on most frequently stated responses)

Hitachi EX 80



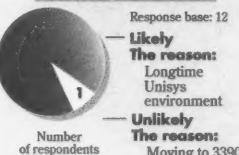
IBM 3090



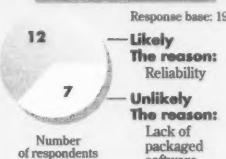
Amdahl 5890



Unisys 2200, A/17



Bull DPS 90



"Verbatim"

What do you like best/least about this product?

Likes

Reliability
Price/performance
Service and support

Dislikes

Not user-friendly
Memory constraints
Slow reaction to IBM software updates

Likes

Reliability
Environmental requirements
Cost of system

Dislikes

Doesn't support IBM software well
Service and support
Difficult to bring in new system

Likes

Reliability
Performance
Ease of use

Dislikes

Lack of software
Inability to provide network management
Not compatible with other vendors' systems

Likes

Reliability
Speed
Service and support

Dislikes

Price is high
Cost for the performance
Not large enough

Likes

Reliability
User-friendly
Speed

Dislikes

Lack of off-the-shelf software
Not compatible with other mainframes
Channel capacity

METHODOLOGY

Products rated in *Computerworld's* Buyers' Scorecard on Mainframes were selected in the following manner: The products had to be from one of the top five vendors in the mainframe market in terms of installed base and revenue. They also had to be the largest capacity systems that were comparable in terms of size and features across all five vendors.

Because of a smaller base of installed systems from Unisys Corp., Hitachi Data Systems Corp. and Bull HN Information Systems, Inc., the mini-

imum number of respondents required for the survey was reduced from 30 to 12 in the case of Unisys and 15 in the case of Hitachi and Bull. Both the Amdahl Corp. and IBM ratings were based on 30 respondents each.

The total scores, which were weighted according to the criteria that all respondents find most important, were computed by multiplying the mean scores all users assigned to the importance of each criterion by the mean scores each user group gave to its own product.

Three-quarters of the 108 respondents were operations managers, and the rest were IS man-

agers. Ninety-four percent of them have been involved with mainframes for five or more years.

Respondents acquire their mainframe systems mostly through direct purchase (53%), and most expect to continue doing so (43%). Another 35% lease from third parties, while 15% lease from the vendor.

Ninety-three percent acquire their mainframes new, and 7% acquire them used. Most of the cost of these systems is in the CPU (28%), according to respondents, and peripherals (17%). Other costs: personnel (16%), operating systems (14%), applications (7.6%), maintenance (7.5%),

environmental controls (6.4%), documentation (6%). The survey was conducted by First Market Research in Austin, Texas.

ACKNOWLEDGMENTS

Computerworld would like to acknowledge the assistance provided by the following individuals and organizations in the preparation of this month's Buyers' Scorecard: Bob Djurdjevic, Annex Research; Susan Gannon, Technology Investment Strategies Corp.; John Logan, Aberdeen Group; Computer Intelligence; and Installed Technology International.

Cross-breeding produces new options

Midsized firms, individual departments eye high-end machines from midrange vendors

BY BARBARA DEPOMPA

It may look like a mainframe, act something like a mainframe and be bought to perform mainframe functions — but is it a mainframe?

That's not an easy question to answer when it comes to the high-end models released in the past year by traditional mini-computer vendors. Digital Equipment Corp.'s VAX 9000, Tandem Computers, Inc.'s Nonstop Cyclone series and other machines are lower in price yet close in functionality to the IBM 3090 and comparable mainframes from plug-compatible manufacturers and proprietary mainframe vendors Unisys Corp. and Bull HN Information Systems, Inc.

Just how robust are these mainframe-like boxes, and who should consider purchasing them?

SMALL MAINFRAMES are attractive to Fortune 1,000 firms that need an adjunct processor in addition to their host to perform specialized applications.

The best way to approach these questions is to consider typical mainframe functionality. Many analysts, including Peter Kastner at Boston-based market research firm Aberdeen Group, define mainframes as systems that cost at least \$1 million, offer speeds of more than 10 million instructions per second and 100 transactions per second, store at least 50G bytes of data, use high-capacity peripherals and can accommodate more than 500 users.

Each of the small mainframes — including the VAX 6400 and the just-released 9000, the Cyclone, Control Data Corp.'s Cyber series, Data General Corp.'s MV40000, Hewlett-Packard Co.'s 980, Prime Computer, Inc.'s 6550 and even high-end IBM Application System/400s — fit these specifications while staying within a \$200,000 to more than \$2 million price range for fully configured models.

Prime's 6550 runs closer to the low end of the scale, while the VAX 9000 can reach well beyond the \$2 million mark.

The lower price is especially appealing to midsized companies with annual revenues in the \$150 million to \$200 million range, according to Dale Kutnick, president of Meta Group, Inc., a Westport, Conn.-based consulting firm. In these firms, processing needs may not demand a large mainframe, not to mention the fact that the budget may not allow one.

Two small mainframes that do especially well in batch processing are the Prime 6550 and DG MV40000. These machines are usually considered high-end systems for smaller companies. Another consideration, however, is that while these smaller mainframes perform the four key functions found on all main-

frames — batch processing, transaction processing, database processing and network management — some machines are tailored for one or two of these areas and are less robust in the others, says Frederick Withington, an independent consultant based in New York.

These smaller mainframes actually outperform their larger counterparts in some specific areas, Withington says. For instance, the Cyclone and VAX 9000 outperform the IBM 3090 in on-line transaction processing applications.

Small mainframes are attractive to Fortune 1,000 firms that need an adjunct processor in addition to their host to perform specialized applications.

At Dow Jones & Co.'s Information Services Division, Tandem's VLX, TXP and CLX systems perform transaction processing functions on a distributed relational database at a lower cost than a large mainframe, according to Frank Panella, director of systems development at the firm. The division plans to upgrade to a Cyclone within the next six to nine

months. "No other vendor has been able to prove to me they can provide the level of distributed relational database capabilities that Tandem did," Panella says.

The systems run the on-line information retrieval and news wire services while a separate organization within Dow Jones handles the general-purpose mainframe computing requirements.

Panella estimates that the Tandem systems save him millions of dollars compared with a typical mainframe installation, not to mention the savings in floor space and electricity required to run the computers.

In a traditional mainframe environment, Panella says, he would have to buy a larger machine than he really needed and wait for his business to grow into it. With

Technology for



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DePompa is a free-lance writer based in Upper Marlboro, Md.

the Tandem systems, "I can add a single processor board and not have to spend money on the five additional processor boards that come in the next largest mainframe model before I need them," he says.

Another factor that attracted Panella to Tandem's systems is "the quickness with which we can add processors and peripherals," he says.

In a mainframe environment, it would require seven or more hours to add a new processor, he explains. "And we'd have to do it over the weekend so we could shut down the system and perform a SYSGEN on the operating system in order to make use of the additional capacity." With the Tandem setup, the system can remain running while the processors are added.

While the VAX 6400 and 9000 are popular for transaction processing as well, their strength also lies in number crunching. One DEC 6400 user in the federal government says his system is used to calculate engineering statistics for government projects in defense. "When clustered together, the 6400 gives us mainframe performance for our application," says the user, who asked not to be identified.

Playing with numbers

Other machines optimized for numeric-intensive and scientific/engineering applications are CDC's Cyber series and HP's 980 models.

At the Delaware Lottery Commission in Dover, Del., a Cyber mainframe sifts

through millions of lottery numbers to find the winning match, according to Welton Reynolds, operations manager at the commission.

Despite the strengths of these smaller mainframes, Kutnick says, the larger machines — optimized for batch processing and capable of storing huge amounts of data — are still better suited for running a corporation's accounts-receivable or accounts-payable applications.

Because these systems are offered by established minicomputer and scientific computing vendors, they each offer mature operating environments for their customers. Both DEC and HP have announced higher end models for delivery in the fall, including a dual-processor version of HP's 980. •

Continued from page 104
machine next.

We have no plans to change our architecture in the near future, and we have no plans for IBM's Enterprise System/9000."

James Peiffer
Computer Center Manager
Dresser Industries, Inc.
Dallas

— **Current mainframe:** "We use three Amdahl mainframes — the 5870, 5860 and V-8. We service 65 to 70 operating units around the world, so we run the full range of applications — from integrated manufacturing, financial and human resources applications to individual programs in these areas. We also run training, office automation and engineering applications."

— **Planned purchase:** "We plan to replace our three Amdahl mainframes with just a single machine at the end of this year or early next year."

The newest mainframes on the market far exceed our requirements for power and speed, so we aren't forced to sit around and wait for the next vendor announcements. I can look beyond the typical initial high-price and lower reliability curves of any of the brand-new products and buy the slightly older, more proven machines that have reached a more moderate market price.

The IBM ES/9000 announcement does not affect our buying decision because we have no processing requirements that would mandate our buying an ES/9000 or ES/9000-class machine.

We used to spend a lot of time evaluating a machine's compatibility and reliability factors. Over the last generation or two of mainframes, however, we've seen reliability become almost a given."

Dick Price
Vice-President of IS
Peabody Holding Co.
St. Louis, Mo.

— **Current mainframe:** "We use IBM MVS/XA and VM/XA. On MVS, we run general business applications, such as inventory, general-ledger and accounting applications.

On VM, we do general-purpose time-sharing, planning, budgeting and engineering."

— **Planned purchase:** "We will take one of two routes: Either purchase a used 3090 Model 300 in the next two years to get more horsepower to run our engineering applications, or we will move the applications off the mainframe to Unix-based workstations and networked servers."

It depends on how fast I can move things to Unix. I'd like to move budgeting and planning applications to networked PCs in an OS/2 environment in the same time frame." •

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Late-model mainframes*

VENDOR	PRODUCT	PRIMARY MARKETS ¹	MOST COMPARABLE SYSTEM	NUMBER OF CPUs IN LARGEST SYSTEM	MEMORY RANGE (bytes)/ CACHE CAPACITY (bytes)	MACHINE CYCLE TIME (nsec)	WORD LENGTH	NUMBER OF CHANNELS/ CHANNEL SPEED (bytes/sec.)	DISK CAPACITY (bytes)	DISK TRANSFER RATE (MIPS) ² unless otherwise specified	PERFORMANCE (MFLOPS) ³	BENCHMARK ⁴	SUPPORTS ETHERNET OR TOKEN RING	OPERATING SYSTEMS	DISTRIBUTION CHANNELS	BASE PRICE	
Amdahl Corp. (406) 746-6000	5890-180E	DP, OLTP, SE	IBM 3090J	1	32M-256M, 96K	15	32	16-48, 4.5M	Unlimited	4.5M	18.4	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$2,163,000 with 32M-byte memory, 16 channels
	5890-190E	DP, OLTP, SE	IBM 3090J	1	32M-256M, 96K	15	32	16-48, 4.5M	Unlimited	4.5M	22.4	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$2,542,000 with 32M-byte memory, 16 channels
	5890-200E	DP, OLTP, SE	IBM 3090J	2	64M-256M, 192K	15	32	32-64, 4.5M	Unlimited	4.5M	34	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$3,704,000 with 64M-byte memory, 32 channels
	5890-300E	DP, OLTP, SE	IBM 3090J	2	64M-256M, 192K	15	32	32-64, 4.5M	Unlimited	4.5M	42	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$4,326,000 with 64M-byte memory, 32 channels
	5890-390E	DP, OLTP, SE	IBM 3090J	2	256M-512M, 192K	15	32	64-96, 4.5M	Unlimited	4.5M	42	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$6,786,000 with 256M-byte memory, 64 channels
	5890-400E	DP, OLTP, SE	IBM 3090J	3	113M-512M, 384K	15	32	64-112, 4.5M	Unlimited	4.5M	58	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$7,057,000 with 113M-byte memory, 64 channels
	5890-600E	DP, OLTP, SE	IBM 3090J	4	128M-512M, 512K	15	32	64-128, 4.5M	Unlimited	4.5M	75	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$8,111,000 with 128M-byte memory, 64 channels
	5990-350	DP, OLTP, SE	IBM 3090J	1	64M-256M, 128K	10	32	32-64, 4.5M	Unlimited	4.5M	34	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$3,920,000 with 64M-byte memory, 32 channels
	5990-500	DP, OLTP, SE	IBM 3090J	2	64M-512M, 256K	10	32	32-64, 4.5M	Unlimited	4.5M	49	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$4,758,000 with 64M-byte memory, 32 channels
	5990-700	DP, OLTP, SE	IBM 3090J	2	64M-512M, 256K	10	32	32-64, 4.5M	Unlimited	4.5M	63	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$6,597,000 with 64M-byte memory, 32 channels
	5990-790	DP, OLTP, SE	IBM 3090J	2	128M-1G, 256K	10	32	64-128, 4.5M	Unlimited	4.5M	63	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$7,725,000 with 128M-byte memory, 64 channels
	5990-1100	DP, OLTP, SE	IBM 3090J	3	128M-1G, 384K	10	32	64-128, 4.5M	Unlimited	4.5M	91	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$10,166,000 with 128M-byte memory, 64 channels
	5990-1400	DP, OLTP, SE	IBM 3090J	4	128M-1G, 512K	10	32	64-128, 4.5M	Unlimited	4.5M	120	NA	NA	Both	MVS, TPF, UTS, VM	Direct	\$12,221,000 with 128M-byte memory, 64 channels
Bull HN Information Systems, Inc. (508) 294-6000	DPS 8000/83	DP, OLTP	IBM 3090-170J	3	32M-256M, 192K	NP	36	48-64, 3M	1G-85G	NP	NP	NA	75 TPS DC (actual)	Both	GCOS8	Direct	\$1,835,000 with 32M-byte memory, two consoles, power supplies, three I/O processors
	DPS 8000/84	DP, OLTP	IBM 3090-180J	4	32M-256M, 256K	NP	36	64, 3M	1G-85G	NP	NP	NA	100 TPS DC (actual)	Both	GCOS8	Direct	\$2,370,000 with 32M-byte memory, two consoles, power supplies, four I/O processors
	DPS 9000/91	DP, OLTP, SE	IBM 3090-400J	1	128M-512M, 128M-512K	NP	36	64, 4.5M	1G-unlimited	NP	NP	NA	273 TPS DC, 17.5 LP (actual)	Both	GCOS8	Direct	\$5,856,400 with 128M-byte memory, I/O processor
	DPS 9000/92T	DP, OLTP, SE	IBM 3090-600J	2	256M-1G, 256K-1M	NP	36	128, 4.5M	1G-unlimited	NP	NP	NA	518 TPS DC, 3.5 LP (actual)	Both	GCOS8	Direct	\$1,248,400 with 256M-byte memory, two I/O processors
	DPS 9000/93	DP, OLTP, SE	IBM 3090J	3	256M-1G, 384K-1M	NP	36	192, 4.5M	1G-unlimited	NP	NP	NA	764 TPS DC, 52.5 LP (actual)	Both	GCOS8	Direct	\$17,117,200 with 256M-byte memory, three I/O processors
	DPS 9000/94	DP, OLTP, SE	IBM 3090J	4	256M-1G, 512K-1M	NP	36	256, 4.5M	1G-unlimited	NP	NP	NA	1010 TPS DC, 70 LP (actual)	Both	GCOS8	Direct	\$22,967,400 with 256M-byte memory, four I/O processors

*All products listed became available after 1988 or are scheduled to ship before January 1991. All listings are marketed as mainframes; specific capabilities vary widely from machine to machine.

¹Listed in descending order according to size: DP = Batch commercial data processing; SE = Scientific engineering; OLTP = On-line transaction processing.

²Millions of instructions per second.

³Full-precision millions of floating-point operations per second; sustained (S), peak (P).

⁴Per-second performance rate measured on the following industry-standard benchmarks: DH = Dhrystones Version 1.1; DC = Debit/Credit (transactions based on 95% subsecond response); LP = Linpack (100 x 100 full-precision in MFLOPS); LL = Livermore Loops (harmonic mean, 14 loops). Vendors supplied either actual or estimated benchmark figures.

⁵One DEC MIPS equals the performance of the VAX-11/780.

⁶Specifications for IBM machines were collected from numerous sources, including in-house sources; written materials supplied by the vendor and Datapro Research, a market research firm in Delran, N.J. MIPS were supplied by Technology Investment Strategies Corp., a market research firm in Framingham, Mass.

The companies included in this chart responded to a recent survey conducted by *Computerworld*. When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

MAINFRAMES

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	PRIMARY MARKETS ¹	MOST COMPARABLE SYSTEM	NUMBER OF CPU'S IN LARGEST SYSTEM	MEMORY RANGE (bytes)/ CACHE CAPACITY (bytes)	MACHINE CYCLE TIME (nsec)	WORD LENGTH	NUMBER OF CHANNELS/ CHANNEL SPEED (bytes/sec.)	DISK CAPACITY (bytes)	DISK TRANSFER RATE (M bytes/sec.)	PERFORMANCE (MFLOPS ² unless otherwise specified)	PERFORMANCE (MFLOPS ²)	BENCHMARK ⁴	SUPPORTS ETHERNET OR TOKEN RING	OPERATING SYSTEMS	DISTRIBUTION CHANNELS	BASE PRICE
Bell NII Information Systems, Inc. (508) 294-6000	DFS 7000 500/700 series	OLTP, DP	DEC 9000, IBM 3090	6	16M-512M, 64K-384K	32	8	10-80, 2.4M	3G-320G	2.4M	NP	NP	35-260 DC	Ethernet	GCOS7	Direct	\$1,900,000 with 64M-byte memory, 10 channels, one tape drive, 8G-byte disk
Control Data Corp. (612) 853-8092	Cyber 2000V	SE, DP	IBM 3090-400J	2	128M-256M, 1628K	9.4	64	10-36, 3M-25M	0.5G-9216G	3M-24M	86.2 (per processor)	150 (S), 220 (P)	1500 TP1 DC, 32 LP, 14.7 LL (estimate)	Ethernet	NOS/VE	Direct	\$2,700,000 with 128M-byte memory, 10 channels, console, power supplies
	Cyber 2000S	SE, DP, OLTP	Larger than (twice the IBM 3090-180J)	2	128M-512M, 1628K	9.4	64	10-36, 3M-25M	0.5G-9216G	3M-24M	52.9 (per processor)	27 (S), 27 (P)	1500 TP1 DC, 12.9 LP, 11.7 LL (estimate)	Ethernet	NOS/VE	Direct	\$2,200,000 with 128M-byte memory, eight channels, console, power supplies
	Cyber 960-11	SE, DP, OLTP	DEC VAX 6000-410, 420, IBM 3090-120S, 4381-92S	1	64M-256M, 32K	11.2	64	24-52, 3M-25M	0.5G-9216G	3M-25M	10.53	2.0 (S)	204.62 TPS DC, 2.0 LP, 2.2 (24 loops) LL (actual)	Ethernet	NOS, NOS/VE, NOS/BE, Unix	Direct	\$705,000 with 64M-byte memory, 24 channels, 20 I/O processors
	Cyber 960-31	SE, DP, OLTP	DEC VAX 6000-420, IBM 3090-150S	1	64M-256M, 32K	11.2	64	24-52, 3M-25M	0.5G-9216G	3M-25M	17.55	3.3 (S)	335.44 TPS DC, 3.3 LP, 3.7 (24 loops) LL (actual)	Ethernet	NOS, NOS/VE, NOS/BE, Unix	Direct	\$1,057,500 with 64M-byte memory, 24 channels, 20 I/O processors
	Cyber 960-32	SE, DP, OLTP	IBM 3090-170S, 180S	2	64M-256M, 32K	11.2	64	24-52, 3M-25M	0.5G-9216G	3M-25M	35.1	6.44 (S)	654.11 DC, 6.44 LP, 7.22 LL (actual)	Ethernet	NOS, NOS/VE, NOS/BE, Unix	Direct	\$1,676,000
	Cyber 962-11	SE, DP, OLTP	DEC VAX 6000-410, 420, IBM 4381-92S, 3090-120S	1	32M-256M, 32K	11.2	64	8-36, 3M-25M	0.5G-9216G	3M-25M	10.53	2 (S)	204.62 TPS DC, 2.0 LP, 2.2 (24 loops) LL (actual)	Ethernet	NOS/VE, Unix	Direct	\$533,500
	Cyber 962-31	SE, DP, OLTP	VAX 6000-420, IBM 3090-150S	1	64M-256M, 32K	11.2	64	8-36, 3M-25M	0.5G-9216G	3M-25M	17.55	3.3 (S)	335.44 TPS DC, 3.3 LP, 3.7 (24 loops) LL (actual)	Ethernet	NOS/VE, Unix	Direct	\$951,750
	Cyber 962-32	SE, DP, OLTP	IBM 3090-170S, 180S	2	64M-256M, 32K	11.2	64	8-36, 3M-25M	0.5G-9216G	3M-25M	35.1	6.44 (S)	654.11 TPS DC, 6.44 LP, 7.22 LL (actual)	Ethernet	NOS/VE, Unix	Direct	\$1,570,250 with 64M-byte memory, eight channels, 10 I/O processors
Digital Equipment Corp. (800) 344-4823, (603) 884-6660	VAX 9000 Model 310	SE, DP, OLTP	IBM 3090-180J	1	256M-2G, 128K	16	32, (64-bit data path, 64-bit vector processor)	1224, 2M	7.3 terabytes	2.8M (Peak RA90)	40 ⁵	80 (Lipack 1,000 by 1,000) (S), 125 (P)	TPC-A: 70 (ACMS/Refb, 144 DSM)	Ethernet	VMS, Ultrix, VAX System V	Direct, OEM	\$1,240,000 with 256M-byte memory, two channels, power supplies, operating system, one Ethernet adapter
	VAX 9000 Model 410	SE, DP, OLTP	IBM 3090-180J	1	256M-2G, 128K	16	Same as above	1224, 2M	7.3 terabytes	Same as above	40	Same as above	Same as above	Ethernet	VMS, Ultrix, VAX System V	Direct, OEM	\$1,690,000 with 256M-byte memory, Vaxcluster interface, power supplies, operating system, one Ethernet adapter
	VAX 9000 Model 420	SE, DP, OLTP	IBM 3090-200J, 3090-300J	2	256M-2G, 256K	16	Same as above	1224, 2M	7.3 terabytes	Same as above	79	158 (Lipack 1,000 by 1,000) (S), 250 (P)	NA	Ethernet	VMS, Ultrix, VAX System V	Direct, OEM	\$2,220,000 with 256M-byte memory, two Vaxcluster interfaces, power supplies, operating system, two Ethernet adapters
	VAX 9000 Model 430	SE, DP, OLTP	IBM 3090-400J	3	512M-2G, 384K	16	Same as above	1224, 2M	7.3 terabytes	Same as above	118	265 (Lipack 1,000 by 1,000) (S), 375 (P)	NA	Ethernet	VMS	Direct, OEM	\$3,390,000 with 512M-byte memory, two Vaxcluster interfaces, power supplies, operating system, two Ethernet adapters
	VAX 9000 Model 440	SE, DP, OLTP	IBM 3090-500J, 3090-600J	4	512M-2G, 512K	16	Same as above	1224, 2M	7.3 terabytes	Same as above	157	312 (Lipack 1,000 by 1,000) (S), 500 (P)	NA	Ethernet	VMS	Direct, OEM	\$3,920,000 with 512M-byte memory, two Vaxcluster interfaces, power supplies, operating system, two Ethernet adapters
Vaxcluster: VAX 9000-420 (2)	SE, DP, OLTP	IBM 3090-600J	8	512M-4G, 512K	16	Same as above	1224, 2M	7.3 terabytes	Same as above	158	316 (Lipack 1,000 by 1,000) (S), 500 (P)	NP	Ethernet	VMS	Direct, OEM	\$4,450,000 with two Vax 9000-420, one Vaxcluster Star Coupler	
Vaxcluster: VAX 9000-440 (4)	SE, DP, OLTP	IBM 3090-600J	16	2G-8G, 2M	16	Same as above	1224, 2M	7.3 terabytes	Same as above	628	1,248 (Lipack 1,000 by 1,000) (S), 2,000 (P)	NP	Ethernet	VMS	Direct, OEM	\$15,690,000 with four VAX 9000-440, one Vaxcluster Star Coupler	

MAINFRAMES

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	MOST COMPARABLE SYSTEM											DISTRIBUTION CHANNELS	BASE PRICE			
		PRIMARY MARKETS ¹	NUMBER OF CPUs IN LARGEST SYSTEM	MEMORY RANGE (bytes)/CACHE CAPACITY (bytes)	MACHINE CYCLE TIME (nsec.)	WORD LENGTH	NUMBER OF CHANNELS/CHANNEL SPEED (bytes/sec.)	DISK CAPACITY (bytes)	DISK TRANSFER RATE (Mbytes/sec.)	PERFORMANCE (MIPS ² unless otherwise specified)	PERFORMANCE (MFLOPS ³)	BENCHMARK ⁴	SUPPORTS ETHERNET OR TOKEN RING	OPERATING SYSTEMS			
Hitachi Data Systems (400) 970-1000	HDS EX Series Models 25, 30, 33	DP, SE	IBM 3090-150	1	32M-256M, 32K-64K	17-20	32	8-32, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	8.3, 12, NP	NP	2.9, 4.8 LP, 2.3, 3.5 LL	Both via internal controller	MVS/ESA, MVS/XA, MVS/370, VM/XA, VM/SP, VM/HPO	Direct	\$749,650, \$1,177,150, \$1,378,000 with 32M-byte memory, eight channels
	HDS EX Series Models 35, 40, 44	DP, SE	IBM 3090-180J	2	32M-512M, 32K-64K	17-20	32	8-32, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	14, 21.7, NP	NP	NP	Same as above	MVS/ESA, MVS/XA, MVS/370, VM/XA, VM/SP, VM/HPO	Direct	\$1,529,050, \$2,243,350, \$2,622,000 with 32M-byte memory, eight channels
	HDS EX Series Models 50, 90, 100	DP, SE	IBM 3090	1, 3, 4	64M-2G, NP	16.5 (model 50)	32	16-128, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	22.3, 70, 88, 485 (P)	121, 364	17.9 LP, 9.9 LL	Same as above	MVS, VM, MVS/ESA, MVS/XA, VM/XA	Direct	\$2,304,300, \$8,406,200, \$8,550,000
	HDS EX Series Model 60, 80	DP, SE	IBM 3090	1, 2	64M-1G, NP	16.5	32	32-64, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	28.3, 50.9	121 (P) (model 60)	49 LP, 9.88 LL (scalar), 13.5 LL (vector) (model 60)	Same as above	MVS, VM, MVS/XA, VM/SP, MVS/ESA	Direct	\$3,450,100, \$4,932,400
	HDS EX Series Model 65	DP, SE	IBM 3090	2	256M-2G, NP	16.5	32	32-96, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	39	NP	NP	Same as above	MVS, VM, MVS/XA, VM/SP, MVS/ESA	Direct	\$5,647,950 with 64M-byte memory, 32 channels
	HDS EX Series Model 70	DP, SE	IBM 3090	2	64M-1G, NP	16.5	32	32-64, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	40.2	NP	NP	Same as above	MVS, VM, MVS/XA, VM/SP, MVS/ESA	Direct	\$3,766,900 with 64M-byte memory, 16 channels
	HDS EX Series Models 75, 95	DP, SE	IBM 3090	2, 4	256M-2G, NP	16.5	32	64-128, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	49.6, 70	NP	NP	Same as above	MVS, VM, MVS/XA, VM/SP, MVS/ESA	Direct	\$7,148,200, \$8,994,400 with 256M-byte memory, 32 channels
	HDS EX Series Model 85	DP, SE	IBM 3090-380S	3	256M-2G, 384K-768K	16.5	32	32-128, 3M, 4.5M, 6M	NP	3M, 4.5M, 6M	NP	NP	NP	Same as above	MVS/ESA, MVS/XA, MVS/370, VM/XA, VM/HPO	Direct	\$6,100,000 with 256M-byte memory, 64 channels
IBM ⁵ (800) 426-3333	3090 Models 1005, 1205, 1505, 1705, 1805	All	NA	1	32M-128M, 64K-128K (per CPU)	15-18.5	32	16-32, 3M, 4.5M	729.8M-22.7G per controller	4.5M	5.5-20.5	133 (P) (180S)	19 LL (180S) (estimate)	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$1,018,000 (1205), \$1,713,000 (1505), \$2,185,000 (1705), \$2,973,000 (1805)
	3090 Models 2005, 2505, 2805, 3005, 3805, 4005, 5005, 6005	All	NA	2-6	64M-512M, 128K (per CPU)	15-17.75	32	32-128, 3M, 4.5M	729.8M-22.7G per controller	4.5M	23.0-102	266 (P) (2005), 399 (3005), 532 (4005), 667 (5005), 798 (6005)	NP	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$3,350,000-\$12,836,000
	3090 Series Models 110J, 120J, 150J	DP	NA	1	32M-64M, 64K (per CPU)	18.5	32	16-32, 3M, 4.5M	729.8M-22.7G per controller	4.5M	7.7-12.9	NP	NP	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$830,000, \$1,017,100, \$1,712,100
	3090 Models 170J, 180J	DP	NA	1	32M-128M, 64K-256K (per CPU)	18.5, 14.5 (180J)	32	16-32, 3M, 4.5M	729.8M-22.7G per controller	4.5M	15.3-22.2	NP	NP	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$2,184,600-\$2,972,100
	3090 Models 250J, 280J, 300J, 300J	DP	NA	1-3	64M-256M, 64K-256K (per CPU)	14.5	32	32-64, 3M, 4.5M	729.8M-22.7G per controller	4.5M	23.8-62.2	NP	NP	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$3,349,300-\$7,001,100
	3090 Models 380J, 400J, 500J, 600J	DP	NA	3-6	128M-512M, 256K (per CPU)	14.5	32	32-128, 3M, 4.5M	729.8M-22.7G per controller	4.5M	59.3-112.5	NP	NP	Both	MVS/ESA, MVS/SP, MVS/XA, VM/HPO, VM/XA	Direct	\$7,989,600-\$12,929,900
	ES/9000 Series Models 340, 500, 580, 620, 720	DP	NA	1-6	Up to 512M, NP	NP	NP	64-128, 10M	2.25G-4.5G per controller	10M	22.2-112.5	NP	NP	NP	MVS/ESA, VM/ESA, VSE/ESA	Direct	\$2,450,000-\$11,065,000
ICL (203) 968-7300, (+44) 61 223 1301	Series 39 Level 13XP Model 1.13XP	OLTP, DP	IBM AS/400-B35	1	8M-32M, NP	170	32	2-3, 5M	1.5G-600G	2.4M	1.1	NA	4.3 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$44,880 with 8M-byte memory, CAPS, power supplies
	Series 39 Level 13XP Model 1.25XP/1, 1.25XP/2, 1.35DXP	OLTP, DP	IBM AS/400-B45 to B60	2	16M-96M, NP	170	32	2-10, 5M	1.5G-600G	3M	1.5-2.8	NA	5.6-10.4 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$68,640 with 16M-byte memory, CAPS, power supplies
	Series 39 Level 13XP Model 1.35XP/1-4, 1.35DXP	OLTP, DP	IBM AS/400-B45 to B60	4	16M-256M, NP	170	32	2M-20M, 5M	1.5G-600G	3M	1.9-7.3	NA	7.4-25.9 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$92,880 with 16M-byte memory, CAPS, power supplies
	Series 39 Level 14S Models L45/1, L45/2	OLTP, DP	IBM 4381-22 to 4381-91E	2	IBM 128M, NP	25	32	2-12, 5M	1.5G-600G	3M	3.6-7.2	NA	15.6-28.9 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$407,880 with 16M-byte memory, CAPS, power supplies
	Series 39 Level 55 Models L55/1, L55/2	OLTP, DP	IBM 4381-91E to 4381-92E	2	IBM 128M, NP	25	32	2-12, 5M	1.5G-600G	3M	6.1-11.7	NA	25.6-45.5 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$894,530 with 32M-byte memory, CAPS, power supplies

MAINFRAMES

PRODUCT SPOTLIGHT

VENDOR	PRODUCT	PRIMARY MARKETS ¹	MOST COMPARABLE SYSTEM	NUMBER OF CPUs IN LARGEST SYSTEM	MEMORY RANGE (bytes)/ CACHE CAPACITY (bytes)	MACHINE CYCLE TIME (nsec)	WORD LENGTH	NUMBER OF CHANNELS/ CHANNEL SPEED (bytes/sec.)	DISK CAPACITY (bytes)	DISK TRANSFER RATE (Mbytes/sec.)	PERFORMANCE (MFLOPS ² unless otherwise specified)	PERFORMANCE (MFLOPS ³)	BENCHMARK ⁴	SUPPORTS ETHERNET OR TOKEN RING	OPERATING SYSTEMS	DISTRIBUTION CHANNELS	BASE PRICE
ICL (303) 966-7380; (+44) 61 223 1301	Series 39 Level 65 Models 1601, 165/2	OLTP, DP	IBM 3090- 110j to 170j	2	32M- 128M, NP	25	32	3-12, 5M	1.5G- 600G	3M	9.7-18.5	NA	39.4-72.8 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$1,000,290 with 32M-byte memory, CAPS, power supplies
	Series 39 Level 80 Models 180/1-4	OLTP, DP	IBM 3090- 150j to 280j	4	32M- 256M, NP	25	32	2-26, 5M	1.5G- 600G	3M	15-56	NA	53-175 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$1,520,670 with 32M-byte memory, CAPS, power supplies
	Series 39 SX 550/20 Model 584 (580/20)	OLTP, DP	IBM 3090- 300j	2	128M- 384M, NP	11.8	32	8-32, 5M	1.5G- 600G	3M	60	NA	212 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$3,936,000 with 128M-byte memory, CAPS, power supplies
	Series 39 SX 580/20 Model 584 (580/20)	OLTP, DP	IBM 3090- 400j	2	128M- 512M, NP	11.8	32	8-32, 5M	1.5G- 600G	3M	90	NA	310 TPS DC (estimate)	Ethernet	VME	Direct, VAR	\$5,877,000 with 128M-byte memory, CAPS, power supplies
NCR Corp. (513) 445-2075	NCR 9800 Model AP 4	OLTP, DP	IBM 9370, 3090, 4381, AS/400, Tandem VME, 504, 506, 512, Unisys A series	24	8M-384M, 2.05M	33	32	4-24, 1.8M	816M- 256G	2.5M	NA	NA	3.5-160 DC (combination of actual and esti- mates)	Intel	VRX/E, Unix via proprietary software	Direct	\$231,621 with 8M-byte memory, four channels, one tape drive, three power supplies, 816M- byte disk
	NCR System 10000 Models 35, 55, 65, 75, 85	OLTP, DP	IBM AS/400, RS/6000	4	2M-64M, 1M-32M	110	8	2-20, 1.5M	2.4G- 20G (Model 85)	1.5M	3.25	NA	NA	Both	Proprietary Interactive Transaction Executive (ITX)	Direct	\$500,000 with 48M-byte memory, 16 channels, 72 memory connectors, one cartridge drive, eight power supplies, 2.4G- byte disk (Model 85)
Stratus Computer, Inc. (800) 480-2000	XA2000 Continuous Processing Systems Models 2260, 2460, 2660, 2860	OLTP	DEC VAX 4000, IBM 3090, Tandem Cyclone	48 (dup- lexed)	64M-1G (duplicated), 1.5M-6M (duplicated)	42	32	2-112, 4M per channel	1.6G- 249.6G (duplicated)	2.458M	NA	NA	RAMP-C- 12,670-82,635 TPH moderate mix (model 2260), 1,065,024 TPH moderate mix (model 2860)	Both	VOS	Direct, OEM, VAR	\$2,350,000 with 64M- to 256M-byte duplicated memory, two to eight channels, power supplies, two to eight tape drives, 781M-byte disks
Tandem Computers, Inc. (408) 725-6000	Nonstop Cyclone, 900 series	OLTP	IBM 3090 series	224	64M-2G, 256K- 2048K	NA	32	4-64, 5M	1348M-9 terabytes	NP	NA	NA	NP	Both	Tandem's Guardian 90	Direct, OEM, VAR	\$1,250,000 with 64M-byte memory, four channels, one tape drive, power supplies, 1.4G-byte disk
Unisys Corp. (215) 966-5367	V410, V500 series, Model V410, V430, V510, V530, V560	OLTP, DP, Financial IS, Health care/Gov- ernment	IBM AS/400 to 3090- 170JR	2	16M- 160M, 40K	40 (V500), 122 (V400)	40	8-64, 8M	100M- 224G	3M	0.88 (V410) to 15.02 (V560)	NA	NP	Ethernet	MCP/VS	Direct	\$106,600 to \$2,600,000 with 16M- to 40M-byte memory, four to 12 power supplies
	2200 series Models 100, 400, 600, 600 ES	OLTP, DP, SE	IBM 9370, 3090, 4381, DEC VAX 8000, 9000	6	12M- 128M, 64K-256K	30-100	36	4-160, 3.1M	1.5G- 1,000G	3.1M	1.2-5.5	NP	NP	Ethernet	OS/100	Direct	\$110,000 with 12M-byte memory, four channels, systems console, one tape drive, power supplies, 1.5G-byte disk
	Micro A, A series Model MA 800	OLTP	IBM AS/400 Models 10, 25	1	12M-36M, None	NP	40	1, 1.2M	280M- 1.4G	1.2M	0.6	NP	NP	Both	MCP/AS	Direct, VAR	\$19,900 with 12M-byte memory, one channel, one tape drive, 280M-byte disk
	A series Models A1, A4, A6	OLTP	IBM AS/400 Models 35, 45, 50, 60, 70	4	12M- 384M, 364K	125	48	2-32, 3.2M-5.4M	280M- 35.2G	NP	0.8-5.6	NP	RAMP-C- 12,670-82,635 TPH (actual)	Both	MCP/AS	Direct, VAR	\$45,000-54,000 with 12M- to 24M-byte memory, one to two power supplies
	A series Model A12	OLTP, DP, SE	Low cost of IBM 3090-J models	1	24M- 144M, NP	NP	48	4-32 (via Datalink processor connectivity), 3.2M- 10M	160G	3.2M, 4M	4.6-15.2	0.96 (S)	NP	Both	MCP/AS	Direct	\$495,000- \$5,500,000 with 24M- to 48M-byte memory
	A series Model A16	OLTP, DP, SE	IBM 3090- 150j to 280j	2	48M- 384M, NP	NP	48	4-242 (via Datalink), 3.2M- 10M	1,600G	3.2M, 4M	13-45.6	7.7 (S)	NP	Both	MCP/AS	Direct	\$1,790,000- \$5,900,000 with 45M- to 96M-byte memory, two to four channels
	A series Model A17	OLTP, DP, SE	IBM 3090- 180j to 400j	4	40M- 288M, NP	NP	48	4-224 (via Datalink), 3.2M- 10M	3,200G	3.2M, 4M	20-72	1.2 (S)	NP	Both	MCP/AS	Direct	\$3,300,000- \$9,500,000 with 48M- to 96M-byte memory, two to four channels
System 80 Models 7E, 10, 15, 20	DP, OLTP, SE	IBM 9370, AS/400	IBM 9370, AS/400	1	8M-16M, 128K (Model 7E), 32K (Model 20)	125	32	2-10, 2.2M-4M	300M- 3.6G	4M (Model 7E), 2.2M (Models 10, 15, 20)	0.4-1.4	NA	NP	Ethernet	OS/3	Direct	\$70,000- \$180,000 with 2M- to 8M-byte memory, one to three channels, power supplies

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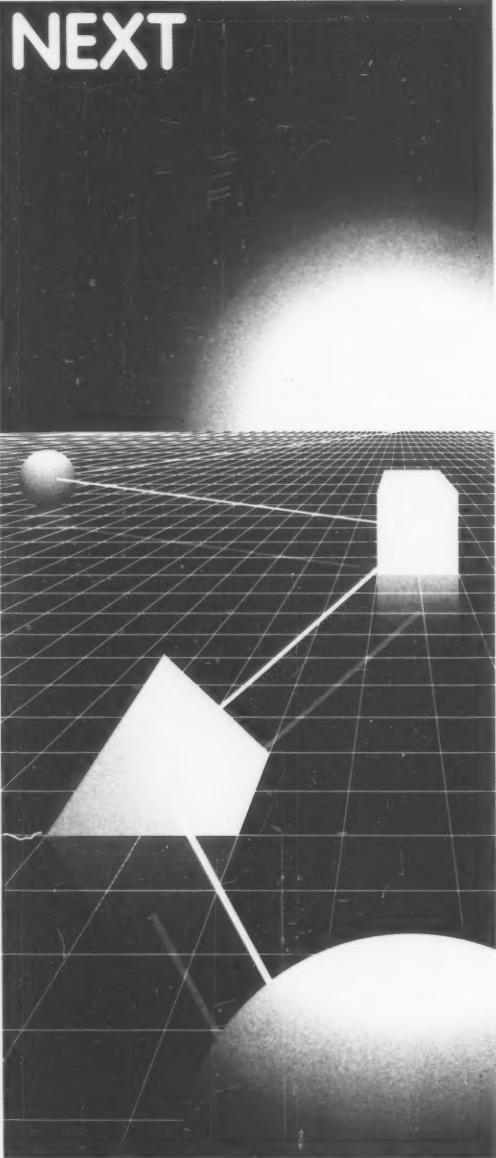
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The scoop on OOPS

Lots of smoke surrounds object-oriented programming systems and technology. Here's a fast primer on what you need to know

BY SHAKU ATRE

Object orientation has become the oat bran of the software market, just as relational databases were five or six years ago. Although many people say that object-oriented programming systems will do something good, a lot of them aren't exactly sure what. They just don't want to let on that they don't know.

There's a good chance that object-oriented technology will compete with relational technology or that relational technology will try to adjust to keep up to date by adding features that provide the benefits of object orientation. Either way, object orientation is something that every information systems manager should be somewhat familiar with.

The following short list highlights the basic truths about object orientation without any hype:

- **The big idea is simple.** The main concept behind object orientation is that repetitive programming code should be written only once and shared by a number of other programs.
- **It is a descendant of Unix.** Object orientation's origins lie within the programming language C++. That, in turn, means its origins are in Unix. Because Unix is going to be a major choice for operating systems in the coming decade, object orientation will have a major following in future years.
- **It has wide database appeal.** After making an impact on programming, object orientation has moved on to the database en-

vironment. Unlike relational technology, its origins are wider than those of a database environment. As a result, object orientation will command a much larger sphere of influence in the coming decade.

There is another reason why object orientation will have wider appeal than relational technology. Relational technology's origins were in Digital Equipment Corp.'s VAX/VMS (Oracle, Ingres, Sybase, etc.) and IBM's MVS (DB2) proprietary operating systems. Consequently, even if relational technology provided flexibility in handling data structure changes, portability between various hardware and systems software platforms was impossible until SQL was accepted by many vendors. However, the many SQL extensions added by various vendors makes the

dream of portability elusive.

- **There is no founding father.** Unlike relational technology, object orientation does not have a theoretical foundation. There is no equivalent of "Dr. Codd" for object orientation. One unfortunate result of this is that it will be very difficult for users to employ some type of yardstick for measuring the "objectivity" of an object-oriented system.

- **People do not live by data**

alone. Relational technology concentrates its focus only on data. It emphasizes that the processes or actions should be categorically separated and should not be considered during the design process.

In contrast, object orientation emphasizes that the real world cannot live by data alone. It is the *actions* done to or with data that give a real world view.

- **Data and objects are one.** One of the building blocks of object orientation is that an object contains both data and procedures or actions. Some procedures, or methods, are made known to other objects. These methods are public methods, while other methods are kept private. Data is encapsulated by methods, and various objects are grouped into classes. Some objects have characteristics



Atre is president of Rye, N.Y.-based Atre Computer Assistance, a division of Coopers & Lybrand.

- **A good bet to overtake relational**
- **There's no 'Dr. Codd' here**
- **Patience is required**

similar to other objects, and these characteristics are inherited. This object-oriented hierarchy differentiates itself from the relational systems.

• **The terms are more complicated than the concepts.** In object orientation, encapsulation and inheritance compete with tuples and cardinality of relational technology. It appears that object orientation is not taken seri-

Object-oriented programming languages and object-oriented database management systems are supposed to increase programmers' productivity by supporting modular programming and providing flexibility.

Modular programming is supported by modules called objects that can be shared. A vendor is supposed to supply a library of objects. Object-oriented DBMSs

port a data dictionary/directory system but do not supply its contents.

• **There are a wide range of applications.** Initially, relational databases were supposed to be used more effectively for decision support systems than conventional networking or hierarchical databases. However, now that RDBMSs are moving into the production environment and into on-line transaction processing, object-oriented databases are a good choice to take their place in decision support systems.

Other good application areas for object-oriented databases are those requiring large amounts of small, heterogeneous data — everything from text, graphics, images, voice and facsimile — and areas that require a great deal of connectivity between them. Computer-aided design and manufacturing, computer-aided publishing and imaging are all good possibilities. For example, a bank may want to not only maintain a record of checking account transactions but also keep on-line photocopies of the checks.

• **The technology is still young.** Most of the object-oriented DBMS vendors are relatively new and have not expended a great deal of effort in creating support software — for example, tools, debuggers and utilities. The result is an almost "do it yourself" mode. By comparison, RDBMSs have a myriad of supporting infrastructural tools for performing the mundane, but necessary, activities of backup, recovery, checkpoint, logging and more.

• **Two types of vendors.** Existing RDBMS vendors, such as IBM, Oracle Systems Corp., Ingres Corp., Sybase, Inc., Digital Equipment Corp. and Computer Associates International, Inc., will add object-oriented features to their existing products. To gain attention and market share, new object-oriented DBMS vendors will fight many of the same battles that nonrelational and relational vendors did five or six years ago.

• **Cultural change is needed.** One of the major differences between relational technology and object orientation is that the latter pretty much requires a culture change. The relational approach kept data structures and algorithms (program logic) separate, as had been the case in the past. Because object orientation puts data and algorithms together as objects, it requires a different mind-set and a completely different method of programming.

Programmers will have to trust other programmers while using the private methods of an object. This requires a more communal way of thinking. Ultimately, programmers will make or break object-oriented technology.

Selected object-oriented languages and vendors

Actor
The Whitewater Group
600 Davis St.
Evanston, Ill. 60201
(312) 328-3800

Advantage C++
Lifeboat Associates
1163 Shrewsbury Ave.
Shrewsbury, N.J. 07702
(201) 389-8950

C-Talk
CNS, Inc.
7090 Shady Oak Road
Eden Prairie, Minn. 55344
(612) 944-0170

C++
Guidelines Software
P.O. Box 749
Orinda, Calif. 94563
(415) 254-9183

Eiffel
Interactive Software
Engineering, Inc.
270 Storke Road
Goleta, Calif. 93117
(805) 685-1006

Exper-Common Lisp
Expertelligence
Suite 302
5638 Hollister Ave.
Goleta, Calif. 93117
(805) 967-1797

Smalltalk-80
Parcplace Systems
1550 Plymouth St.
Mountain View, Calif. 94043
(415) 691-6700

XLISP
Compuserve by: D. Betz
Compuserve ID 76704,47

ously unless the term "paradigm" or other big words are used. Jargon aside, the concepts are just as simple as those of relational technology.

• **It promises productivity.**

are a blend of systems software and applications software, whereas relational database management systems are systems software and not applications software. RDBMSs sup-

Object-oriented guide

What are the right questions to ask?

A number of issues need to be considered before you get dazzled or disenchanted by object-oriented technology. The following are some key questions:

- **Do I have the right technical environment?** If C, C++, Unix, X Window System or Smalltalk aren't in use in your organization, then object orientation is not for you — at least right now. Almost all object-oriented technologies run on Unix workstations or Apple Computer, Inc.'s Macintosh. It will take at least a few more years before object-oriented DBMSs will run on DOS-based platforms. Borland International's C++ and Microsoft Corp.'s C++ compilers may expedite the process.

- **Am I looking for a long-range solution?** An object-oriented DBMS is not a "quick fix" to existing problems. Before using an object-oriented DBMS, a firm has to invest substantial effort into designing the objects. Object-oriented DBMSs may not deliver great benefits if the objects are not "complex."

Object-oriented DBMSs store complex data types, such as text, graphics or voice information, that RDBMSs cannot handle. An example of a complex data type could be storing a withdrawal transaction from a checking account with a copy (image) of the check stored for reference.

- **Am I willing to try a prototype?** Before determining whether an object-oriented DBMS is for you, consider a small prototype. Prepare an entity-relationship diagram. In the diagram, each data item (entity) has a set of associations (relationships) with other data items. These diagrams are used to map the underlying structure of a database so that formal database record definitions and integrity rules can be created.

Because the main theme of object orientation is that there should not be one type of system in the database or file system and another in the program, flow of data through the system should be represented via data flow diagrams and state-transition diagrams. Entity-relationship diagrams, data flow diagrams and state-transition diagrams can then be used to verify with the user that the systems analyst's understanding of the system's behavior is correct and could be used to generate program specifications that match the understanding. Superimposing database design and process design is quite time-consuming but crucial for object orientation to be successful.

- **Am I willing to wait for a payoff?** As far as application program development in an object-oriented environment is concerned, not much productivity increase will be seen in the first few years until a library of objects and object modules is built. After the library is built and application programmers are able to use the modules repetitively, productivity will improve.

As with other technologies, patience is also a virtue with object orientation.

- **Am I willing to start educating my staff today?** A prudent manager should start educating the organization about object-oriented technology. Object orientation is a promising technology that is going to make big waves in the 1990s. Even if object-oriented technology doesn't turn out to be the oat bran of the software market, it may help some ills of the industry if prescribed and used properly.

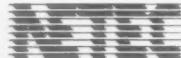
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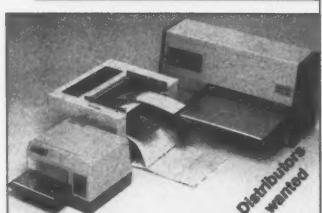
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COMPUTER INDUSTRY

NATIONAL BRIEFS

But wait, there's more

Stardent Computer, Inc. co-founders and former executives Allen Michels and Matthew Sanders, who were given the boot by the board shortly after the two rocked the computer industry by filing technology theft charges against the firm's Japanese partner/investor Kubota Corp., this past summer, are singing another somebody done somebody wrong song. Earlier this month, the two added an unlawful termination charge to their suit — and added Stardent Chief Executive Officer J. William Poduska and the company as defendants.

Many happy returns

They're baa-aack. The nation's venture capitalists are rededicating their efforts to the field that proved so fertile for them a few years back: computer technology. A recent survey conducted by New York-based market research company Technologic Partners, Inc. showed venture investing in computer-related companies in the first quarter of 1990 at \$285 million, which was up 44% over that amount in last year's comparable period.

More briefs on page 122

BY ALAN J. RYAN
CW STAFF

The document image processing market is hardly the stuff of fairy tales, but its phenomenal growth potential may have some executives dreaming of golden eggs.

"There [are] a billion zillion dollars to be made in this area," said Ben Levitan, a manager at Nolan Norton & Co. in Lexington, Mass., an information technology firm of KPMG Peat Marwick.

Image processing — taking paper documents and scanning them into electronic form where the data can be manipulated and accessed simultaneously by whom-ever needs to see it — is hot. The market is growing at a compound annual rate of 30% to 50%, according to analysts, and there is no end in sight.

Gregory C. VanBuren, a consultant at the industry management section of Cambridge, Mass.-based consulting firm Arthur D. Little, Inc., said that document image processing is the fastest growing segment of worldwide data processing.

BIS CAP International, Inc., a Norwell, Mass.-based research and consulting firm, estimates that the market will reach \$2 billion by 1993. Analysts at Nolan Norton endorse figures that say the market could climb as high as \$12 billion by the mid-'90s.

"The whole notion of information management is not just breaking it down into data entities, but managing the work that goes on in businesses," Levitan said. Imaging, he said, is a compelling technology for corporate

decision makers because it is the unfulfilled promise of data processing coming through.

"Imaging is going to make a major difference," Levitan said. "It will offer [the] benefits of what goes through the tube rather than the tube itself."

Early comers into the potentially lucrative market have been quick to grab market share and positioning. However, there are plenty of slower starters who will be able to make a mint in the multibillion-dollar market-to-be, ac-

Picture this

Imaging system installations are expected to hit the \$2 billion mark within three years

Year	Installed base	Value of systems installed
1989	1,334	\$360M
*1990	2,413	\$540M
*1991	4,381	\$922M
*1992	7,458	\$1.4B
*1993	12,074	\$2.0B

*Projected

Source: BIS CAP International, Inc.



CW Chart: Paul Mock

cording to analysts.

Today's big names in imaging include Wang Laboratories, Inc., IBM and Filenet Corp.

"Imaging is the strategic product for Wang," Levitan said. "They will be key players and won't step back — if they can sort out their financial troubles."

Also contending for the field are such companies as Xerox Corp. and Digital Equipment Corp. Players in the near future will likely include Bull HN Information Systems, Inc. and Apple

Computer, Inc., analysts speculated.

Tomorrow, however, there could be another tier of imaging providers that will look at the business world from a different perspective, Levitan said. These imaging providers, he said, will have radical approaches.

For instance, he said, if a company like Sun Microsystems, Inc., with its large installed base of desktop workstations, were to enter the imaging arena, it could make progress quickly. Such an entrant, Levitan said, would "have the desktop and could work from the desktop back."

It is unlikely to be only vendors that board the imaging bandwagon, according to industry observers. System integrators will play a big role in the imaging market by helping users to put together pieces of equipment that were not meant to work together. Also, consultants will be called in to many companies to help with business process redesign that imaging will bring about.

One expected result of the not-yet-surfaced vendors will be imaging on a much smaller scale than that on which it has been done to date.

Because the market is so new, Levitan said, the big players five years from now could be very different from today's top five.

By the end of the current decade, said Richard Schwartz, an analyst at Shearson Lehman Hutton, Inc., the imaging market will "reach into every nook and cranny" of business.

With the expense of imaging projects so high for users, most of the big imaging projects happening today are limited to big companies with large

Continued on page 126

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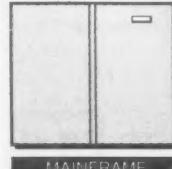


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*PC WEEK, May 7, 1990. **Direct LocalTalk connections dependent on NetWare 386 NLM due Fall, 1990. Macintosh connection achieved today via standard bridges.

Semiconductor group seeks tax credits

BY GARY H. ANTHES
CW STAFF

ARLINGTON, Va. — An econometric model commissioned by the National Advisory Committee on Semiconductors (NACS) has turned up an unexpectedly strong correlation between depreciation schedules and investment in capital equipment. A study released here by the NACS said that reducing the depreciation period for semiconductor manufacturing equipment from its current five years to three years would cost the U.S. Treasury \$180 million but would boost industry spending

on new state-of-the-art equipment by some \$450 million.

That would go a long way — but not all the way — toward helping U.S. industry catch up with its Japanese counterpart, the NACS said.

The NACS is using the figures to bolster its recommendations that the federal government stimulate capital formation in the semiconductor industry by beefing up the research and development tax credit, reducing capital gains taxes and allowing accelerated depreciation of manufacturing equipment.

"The sensitivity of investment to de-

preciation is surprising," said Ian M. Ross, the NACS chairman and president of AT&T Bell Laboratories. Of the four proposals in the study, only the acceleration of semiconductor equipment depreciation has not been extensively studied by Congress or the Bush administration, Ross said.

The NACS also proposed the following:

- Reduce the capital gains tax rate to 20%. That would boost industry spending by 7%, or \$285 million, the NACS said.
- Increase personal saving incentives. The NACS estimated that a 2% reduction

in interest rates — which could result from more savings — would increase capital investment in the industry by 3%.

• Bolster the research and development tax credit by making it permanent, by increasing the credit rate and by broadening the base to which it applies.

Jerry R. Junkins, chairman and president of Texas Instruments, Inc. and an NACS member, said the loss of tax revenue that would stem from liberalizing depreciation rules should be viewed as a short-term sacrifice for a greater long-term gain. "But it's an open question whether it can be accommodated in the current budget summit."

Ross said that the Bush administration is studying the proposals, but that he had not heard any conclusions. He said the proposals would be beneficial to any industry with high capital investments and high R&D costs.

The NACS also looked at the effects of switching to a one-year depreciation schedule and found that would boost annual capital spending by 26%. That would increase capital expenditures as a percent of sales from its current U.S. average of 18.5% to 23.3%. In Japan, the ratio now stands at 25.5%, the NACS said.

INTERNATIONAL BRIEFS

Why are we in Vietnam?

For OTC International Ltd., the answer appears to be: to make telecom deals. The Sydney, Australia-based company spent the past five years creating an earth station and related telecommunications facilities in Vietnam. Upon recent completion of the contract, the parties signed on for a continuation of the activities. This time, OTC International has bagged what it claims is the biggest telecommunications-based export contract ever entered by an Australian firm: a projected decade's worth of international network and domestic infrastructure development to be done under the auspices of Vietnam's Directorate General of Telegraphs. OTC International's revenue under the contract is estimated at \$195 million.

G'dye and g'bye

Struggling Dutch electronics company Philips NV earlier this month handed over the lion's share of responsibility for its Australian computer and telecommunications interests to Imageering, a distributor based in Sydney. Under their agreement, according to a Philips spokesman, the company will take a stake in Imageering, which in turn will take an equity position in Philips' customer support operations. Financial details remain to be worked out, he said. The move, the spokesman maintained, is not part of — but actually strategically predates — the restructuring plans announced by Philips earlier this year in a bid to boost its flagging fortunes.

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COMMENTARY

Patricia Keefe

To exchange—or not exchange



At a time when it is seeking a mutually beneficial technology exchange with Novell, Microsoft recently launched an ambitious assault on Novell's lifeblood reseller channel and end-user market share.

This has no doubt alerted Novell officials to the risks involved in participating in a technology exchange that would enable Microsoft to more quickly provide promised interoperability between its OS/2 LAN Manager and Novell's Netware.

"Novell [today] fears it would somehow legitimize the competition by doing these things," says Jamie Lewis, an analyst at Clarke Burton Corp. and a former Novell employee.

"Exactly," says Mike Murray, Microsoft's manager of network products, who claims the ball is in Novell's court. "If I were in [Novell CEO] Ray Noorda's shoes, I'd be asking myself, 'Does this [technology exchange] make sense?'"

According to Murray, Noorda is standing under a two-edged sword. If he plays ball with Microsoft, he may be helping a competitor.

However, a refusal could undermine years of saying that Novell's interests lie purely in expanding the LANscape and helping all LANkind.

Boy, is this true. Noorda has been slinging this hash ever since I can remember. Maybe now is the first real put up or shut up test of Novell's self-sacrificing theme song.

If Novell declines to share information, and it's looking like it might, thanks in part to an older, unresolved contract dispute with Microsoft, Murray says he can still pull off interoperability between the two product lines. It will simply take a little longer.

He has to. Interoperability is vital to pushing Microsoft's so far weakly received LAN Manager. More than widespread accessibility and the added functionality of LAN Manager 2.0, interoperability is one of two keys to getting the Fortune 1,000 — mostly weaned on Netware — to take LAN Manager seriously. Some estimates suggest that 50% to 75% of IBM Token Rings run Network.

Microsoft also faces reseller skepticism. "LAN Manager 2.0 is better than 1.0, but nobody wants it," says one dealer. Why? Because users just do not want to take a chance on Microsoft, he claims.

Many large corporations formally standardized on LAN Manager several years ago, but IS ignored the directive, adds Leo Spiegel, an executive vice-president at LAN Systems. Providing safe passage back to Netware might help assuage some of those fears.

The second, and separate, bellwether for Microsoft revolves around synchronizing IBM's LAN Manager-based OS/2 LAN Server and LAN Manager.

Although the IBM server is LAN Manager-based, there are enough differ-

ences between the two products so that users are allegedly reluctant to purchase either for fear of picking the wrong one.

However, 10 months after pledging to make the two mirror images, IBM and Microsoft are still at work on the project, with no delivery date in sight. It won't happen before year's end, Murray says. IBM says it remains committed to the project.

Moreover, since many users grumble about LAN Server's capabilities, a Netware link looks like Microsoft's best bet.

It may look like Novell is holding the cards, but in actuality, that might not be the case. It, too, has a stake in interoperability — more so in the long term.

While many Netware users shrug

NOORDA HAS BEEN slinging this hash ever since I can remember. Maybe now is the first real put up or shut up test of Novell's self-sacrificing theme song.

when asked if interoperability with LAN Manager is important to them, those who are migrating to OS/2 are concerned. Novell has not adequately answered their OS/2 support questions.

As the downsizing trend picks up and users move from islands of LANs into a true client/server environment, Microsoft and Novell may well find themselves facing the same growing chorus: When can your server talk to his server?

We are already seeing signs of user

impatience over this issue. At least two firms have decided to abandon Netware for LAN Manager. The reverse, in which users decline to install LAN Manager, is probably also true.

It just may be that the networking leader of the 1990s will be the one most able to interconnect with its competitor's equipment.

Keefe is *Computerworld's* senior editor, PCs and workstations.

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CW 9117

Dell launches tough attack on Compaq

BY PATRICIA KEEFE
CNET STAFF

AUSTIN, Texas — Armed to the teeth with new products and a boudacious ad campaign, Dell Computer Corp. is going after neighbor and rival Compaq Computer Corp. with guns blazing.

Dell claims that its most aggressive assault yet on what it sees as the new "gold" standard — Compaq — is scoring hits. Not only does Joel Kocher, Dell's senior vice-president of U.S. sales and operations, claim to have logged a 50% increase in requests for information in just

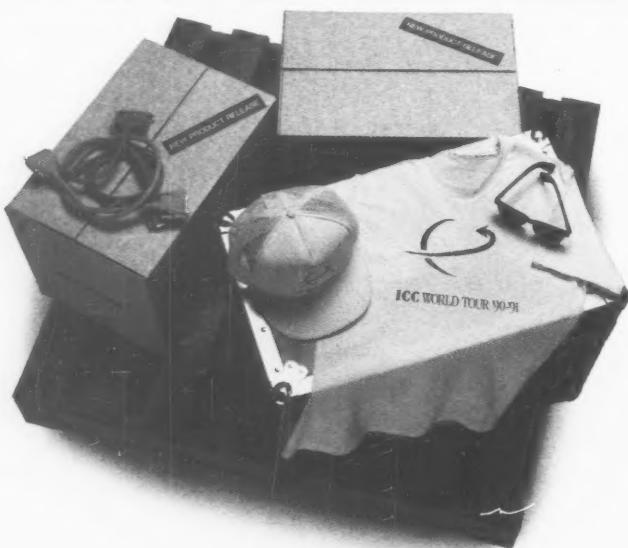
10 days, but Compaq last week announced a slate of 20% to 25% price cuts.

Dell's plan of attack is two-pronged. Coinciding with the introduction two weeks ago of its first high-end servers and a disk array controller, the mail-order clone maker also unleashed a massive advertising campaign, including 12-page magazine inserts, targeted at readers of the major personal computer and business publications. Zingy ad copy takes a no-holds-barred approach to comparing Dell and Compaq service and pricing.

First, the promotion picks off cheap clones. Then it gets down to business,

training the big guns on Compaq. The first shot asks: "Can you stomach spending an extra \$10,000 for a PC network or Unix workgroup server when the big extra is dubious service? Servicing servers is beyond most Compaq dealers."

From there, readers are treated to a visual comparison of analogous Dell and Compaq products, capped by one-liners such as "Lap of Luxury," over an Intel Corp. 20-MHz 80386SX-based Dell laptop priced at \$3,899, contrasted with "Lap of Lunacy" over a \$6,799 Compaq offering. "How those other guys can charge so much is insane," the ad states.



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According to Dell, the firm has historical reason to believe in the hard-hitting approach. This campaign follows an earlier one in which Dell attacked the dealer channel. "It really helped launch Dell," said Dan Ness, an analyst at La Jolla, Calif.-based Computer Intelligence.

Compaq spokeswoman stated that last week's price cuts were simply a "natural response to preparing for the fourth quarter" traditionally the company's busiest. In a prepared statement, Compaq North America President Mike Swavely suggested that "customers who have been considering other products will want to take another look at Compaq."

Dell, obviously, isn't buying it, but neither are some PC analysts.

Compaq is somewhat vulnerable right now, partially because of product availability problems, according to Bob Brown, a marketing consultant at Norcross, Ga.-based R.G. Brown and Associates, and Steve Hess, an analyst at Creative Strategies Research International.

"If you look at the figures Compaq has been reporting, there seems to be an opportunity [for us]," Kocher said. He said Dell hopes to convince corporate users who are looking to add a third product to their short lists that they do not have to sacrifice Compaq-level quality for price.

Also, sales of its high-end Systempro server have failed to meet projections, so Compaq is cracking down on dealers who fail to complete required training.

While Compaq grapples with user doubts about purchasing high-end equipment from dealers, Dell is pushing its reputation for solid service and support.

The Compaq spokeswoman conceded that "all [of those mentioned] are all valid points" but insisted that none were "overriding concerns in the decision to decrease prices."

"Dell is trying to portray themselves as a premium brand at value price, rather than a premium brand at a premium price," said Bruce Stephen, a hardware analyst at International Data Corp., a Framingham, Mass.-based market research firm. It is attempting to do this in part by riding Compaq's coattails, Ness added: "How better to position yourselves than by associating your name with someone who has a better position?"

NATIONAL BRIEFS

Hell no, we won't go

However Vienna, Va.-based **Systems Center, Inc.**'s recent acquisition of Reston, Va.-based neighbor **Unitech Software** was received in other quarters, it certainly roiled the waters out in Lisle, Ill., where **Unitech Systems, Inc.** is headquartered. The 8-year-old company, which is privately held and determined to remain so, is suffering from some folks' misapprehension that it is about to be bought by Systems Center. Anyone who remains confused, listen up: Unitech Software is a Unix systems utility developer and is about to be acquired. Unitech Systems is a reconciliation and verification software purveyor to the IBM VMS and VSE markets and is not for sale, one of its executives said.

Did we say that?

BY RICHARD PASTORE
CW STAFF

A Dell PC in a retail store window? Never happen.

Such has been the refrain in the halls of mail-order pioneer Dell Computer Corp. since its founding in 1984. But beginning next month, Dell's entire personal computer line will be showing up in windows of Soft Warehouse, Inc., the nation's largest computer superstore

dealership. Soft Warehouse boasts 13 superstores; all other superstores in the market are regional chains.

Although Dell has happily fiddled while traditional retailers like Businessland, Inc. burned, it has lately taken notice of the growing success of the superstores. These cavernous outlets sell PCs for virtually the same low prices as do the mail-order firms but have the advantage of the in-person touch.

Dell's agreement with Soft Ware-

house "is a recognition that there's a limit to how much corporate America will buy by telephone," said Seymour Merrin, president of Merrin Information Services in Palo Alto, Calif. "It's the only way to expand their business."

"We wanted a conduit that was aimed at the less-sophisticated user," agreed Joel Kocher, Dell's senior vice-president of U.S. sales and operations. The small and medium-size business customer and home market buyer — the superstores' bread and butter — was not attracted by Dell's direct-mail channel of distribution, Kocher said.

Dell's infrastructure is overripe for

the significant sales volume increase it hopes to gain from the agreement. The company's ill-timed move to an expanded manufacturing plant 11 months ago coincided with the bust in the domestic PC market. With only one shift operating, and that at less than capacity, Dell needs to better leverage this facility, Merrin said.

Soft Warehouse, a \$300 million firm, reportedly will price the Dell line exactly the same as Dell's catalog prices. Its salespeople will be trained to sell and support the hardware, and each box comes with Dell's toll-free and next-day on-site support.

COURT REPORT



A \$48.3 million award won by a Pasadena, Calif., gas and oil exploration company was recently reduced to \$1.9 million by a U.S. District Court judge in Los Angeles. In so deciding, he wrote a new chapter on one of the most celebrated computer liability cases in years.

On Aug. 15, Tulsa, Okla.-based Seismograph Service Corp. was ordered to repay Geophysical Systems Corp. (GSC) the \$1.9 million GSC paid for seismic data processing software in the early 1980s. The award was for what Judge A. Wallace Tashima found to be violations of California's fair competition statute, said Seismograph attorney Steve Holtman.

In its original complaint, Pasadena, Calif.-based GSC claimed that it was forced into Chapter 11 in 1983 because Seismograph's software did not perform as promised. A jury in 1988 awarded GSC \$48.3 million for breach of warranty and covenants and unfair treatment by Seismograph, Holtman said.

The judge threw out the bulk of the jury's award and called for a new trial. This summer, a new jury dismissed all breach of warranty and covenant charges, Holtman said. However, Judge Tashima said that he, himself, would rule on the unfairness charge. He said that he believed GSC had proved that it had been treated unfairly.

Tandy Corp. and its Grid Systems Corp. subsidiary are going after Texas Instruments, Inc. on anti-trust charges. In a complaint filed earlier this month, Tandy and Grid alleged that TI is making systems makers ante up excessive license payments for invalid patents.

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Bull posts first-half losses, analysts question its stability

ANALYSIS

BY PHILIPPE ROSE
ING NEWS SERVICE

PARIS — After recording solid profits between 1985 and 1988, Groupe Bull posted a record \$348 million in losses for the first half of 1990.

According to Chairman and Chief Executive Officer Francis Lorentz, the firm, like other manufacturers, was a victim of

the worldwide computer market's shift toward standard products.

The year started on a disappointing note as Bull found itself facing the cost of a difficult internal restructuring. Magnified by harsh price competition, the drop in profit margins increased. Despite the disappointments, Bull management remains optimistic for the rest of 1990 because approximately 60% of group revenue comes in the second half, Lorentz said.

Bull is not alone in its problems. Euro-

pean manufacturers overall are in stormy waters. However, that fact cannot absorb all of the blame for Bull's slide. Bull is suffering from more fundamental handicaps, stemming from its product range, company structure and financial situation.

Bull's slate of product offerings is too extensive, with maintenance and upgrade services adding to overall group costs, the company acknowledged. End users have also criticized Bull for its sluggishness in opening up to standards and its uncompetitive pricing. Furthermore, recent corporate structural changes — notably the integration of Zenith Data Systems and U.S.-based Bull HN Information Systems, Inc. — have slowed business.

Bull productivity, when measured in terms of revenue per employee, remains

below that of most competitors. In 1989, this figure rose to \$117,000, which is equivalent to per-employee revenue at Italy's Ing. C. Olivetti & Co. and UK-based International Computers Ltd. In stark contrast, IBM's per-capita output for the same year reportedly was 40% greater.

In a market that is rapidly turning global, Bull is competing with U.S. companies that boast large and loyal installed bases and Japanese firms that face a protected domestic market. In this context, Bull's plan of action is very limited.

Analysts remain pessimistic about the possibility of group profitability for Bull this year. Despite a reduction in its work force and a \$278 million subsidy from the French government, Bull's return to a competitive position seems uncertain.

Imaging

CONTINUED FROM PAGE 117

budgets. However, Levitan sees market potential to open up imaging to small companies — for instance, a local hardware store or bakery. "There are lots of venture [capital] people looking into ideas like that, looking for mass markets and alternative distribution," Levitan said.

The difficulty of making a mark in the imaging field is real, however. "It's an easy business to get into, but very difficult to prosper in," Schwartz said.

The electronic imaging market will reach across many multibillion-dollar markets, he said. Still, he added, for most companies entering the imaging field, the operating costs probably cannot be covered until a company realizes gross profits approaching the \$10 million mark and sales of \$20 million.

Additionally, said Schwartz, selling imaging products to user companies is different than selling anything else. "This business has a unique set of selling dynamics to be learned," he said.

Schwartz noted that vendors in the field "learn to get comfortable with discomfort."

Proprietary solutions

Many of the early entrants into the imaging field created proprietary solutions for single users. In this decade, it is expected that more vendors will begin to mix and match in order to integrate by application. Off-the-shelf hardware and software for imaging will be greatly improved, Schwartz speculated.

As users look more and more to open systems, the fate of proprietary solutions could be cast into question, Levitan said. However, he added, users who are waiting for standards in imaging may be missing the boat: "Waiting for standards is like waiting for Godot."

As long as a company puts in an imaging system that can be integrated with its other systems where it is needed — even if it requires some technical finagling — the benefits of imaging can be realized today, market observers agreed.

"Ford Motor Co. has something like 16 imaging applications, and none of them talk to each other, but each are valuable," Levitan said. "Most of them went in as working pilots, and now the users won't let [Ford] take them out."

For that reason, though, Levitan said he advises companies that want standardized solutions within their walls to create consistent and enforceable standards policies.



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COMPUTER CAREERS

End-user managers: Versatile players

BY NAOMI KARTEN
SPECIAL TO CW

End-user computing wasn't born yesterday, but most organizations find it hard to pin down a specific career path for the people responsible for managing it. Generally, end-user computing managers can either climb higher under the information systems umbrella or pack their technological bags of knowledge and head into the user side of the company.

Originally, user support was strictly an IS function. End-user computing managers — information center managers, client services managers, personal computer support managers and managers of support groups — focused mainly on selecting hardware and software. They also established and provided training and support services and formulated policies and standards in the selection and use of computers.

What has happened, though, is that end-user support groups have become more business-oriented than product-oriented. Companies have broken away from hiring strictly technical staff and are hiring people from diverse occupations — including chemists, musicians, first-grade teachers and end users — for support positions.

The information centers find that end users in particular bring an understanding of the user community and knowledge of the industry that is extremely valuable, says Dave Flansbaum, managing director at Source EDP's San Francisco office. They're armed with the ability to better understand, serve and support users, he says.

Because of this melding of business and product support, many end-user computing managers are finding themselves highly marketable.

"All end-user computing managers had better be able to move to the business side with all the experience they've drawn," says Tom Lutz, vice-president and chief information officer at Armco Advanced Materials Corp., a specialty

rent position has given him a good working knowledge of all areas of the company. He says he would be well prepared should he want to move into an end-user department.

"Basically, these managers interface with all levels of the organization, and it tends to be a very high-visibility position. It's quite natural, if they're doing a good job, for them to catch the eye of somebody

Dollar signs

End-user computing managers stand on the high ground in end-user support

Average total compensation (salary plus bonuses)

Title	Average compensation	Company size by revenue or assets		
		Less than \$50M	\$50M to \$499M	More than \$500M
Manager of end-user computing	\$49,463	\$43,672	\$47,923	\$56,139
Information center manager	\$47,100	\$39,447	\$45,637	\$55,452
LAN manager	\$41,177	\$37,555	\$40,390	\$45,868
PC specialist	\$33,306	\$30,274	\$33,753	\$35,827

Source: CW 1990 Salary Survey

CW Chart: Doreen Dahl

steel manufacturer.

One of the most obvious areas these managers can move into is user departments — finance, marketing and public relations. One of Lutz's colleagues left the end-user computing area and headed into human resources, handling industrial relations with the labor union. "The key is that she already understood many of the different things going on throughout the business, so it was a natural move," he says.

Michael Boeldt, an end-user computing manager at The Company Store, which manufactures down feather products in LaCrosse, Wis., says that his cur-

rent position has given him a good working knowledge of all areas of the company. He says he would be well prepared should he want to move into an end-user department.

"Basically, these managers interface with all levels of the organization, and it tends to be a very high-visibility position. It's quite natural, if they're doing a good job, for them to catch the eye of somebody

else within the company," according to Flansbaum.

Many managers who have made this type of move into the user community say that the most amazing thing is how their perspectives change. A trivial spreadsheet problem looks dramatically different when viewed within the context of business deadlines, pressures and commitments.

End-user computing managers are also heading into hardware, software and research organizations.

For instance, a few managers who were quoted frequently by the press came

to the attention of some large industry re-

search firms. They're now responsible for major research studies in the microcomputing field, tracking industry trends in hardware and software. The value is not just in their knowledge of the technology but in how it's being used.

These managers are viable candidates for IS positions, too. For example, one former information center manager at a bank became a manager of data security and quality assurance at another company and found tight overlap between his old and new responsibilities.

Many avenues

Other IS areas in which end-user computing managers have been tracked are: planning positions, directors of training or user services and database managers charged with the development of a comprehensive database.

The biggest difference in placing end-user computing manager-types as opposed to other IS staff people is that their background is tied to a specific knowledge, Flansbaum says.

These managers' marketability is based on their *business* expertise in a particular type of company: They may be experts on manufacturing, financial systems or health care systems, he says.

"An IBM mainframe Cobol programmer could work at any type of company because of the commonality of hardware and software," Flansbaum adds.

End-user computing management is not an end-of-the-road job. It has become an area that can offer significant opportunity to professionals coming from numerous directions, and it can open up opportunities to move in at least as many future directions.

Karten is president of Karten Associates in Randolph, Mass., and editor of the monthly newsletter "Managing End-User Computing."

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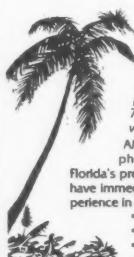
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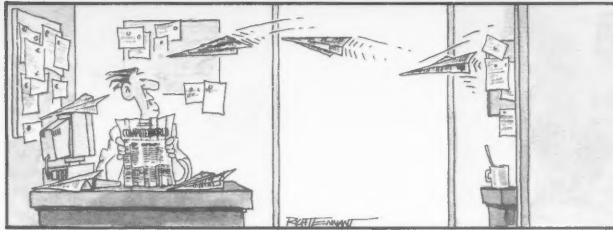
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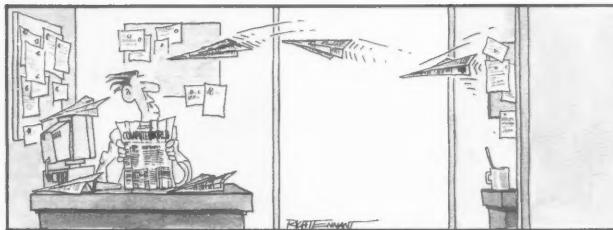
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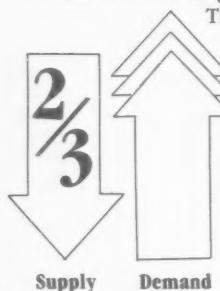
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so has the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business than require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely is competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher in the '90s.

Ads in local papers don't reach your major hiring market anymore

That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who

would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that

reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

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That's because *Computerworld* reaches over 612,000 qualified computer professionals every week — the largest audience of its kind, and one that's rich with passive and active job seekers.

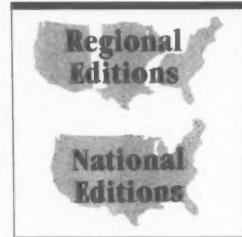
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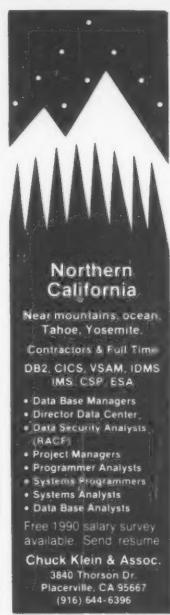


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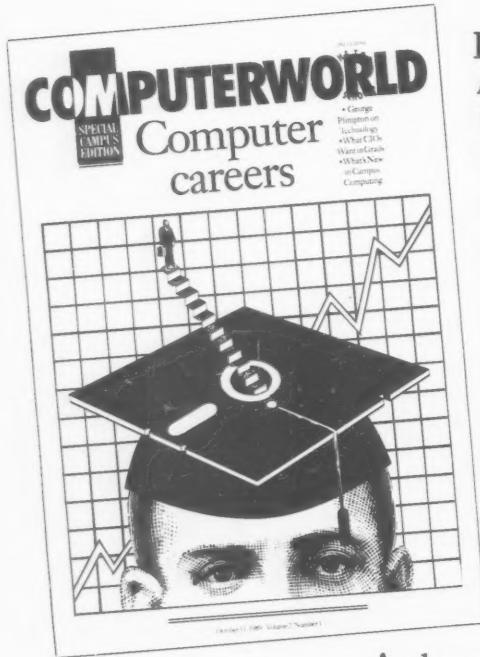
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Planned Editorial Features:

(subject to revision)



- MIS salary and job satisfaction survey
- Where are the best jobs?/What positions are hot?
- Experiences of recent MIS graduates in their first jobs and what helped them in school
- The MIS career ladder
- Profiles of acclaimed top level MIS executives
- The strategic advantage of computers and how they play a key role in running a company

MARKETPLACE

Smart buying decisions today make selling easier tomorrow

BY ALEX RANDALL
SPECIAL TO CW

Unloading used personal computers and circulating PCs through an organization creates unique problems for corporations.

The job of unloading a cluster of used computers usually falls to the corporate microcomputer manager. It's important for this person to prepare for the sales over the long term, choose the best means of disposal and tie up various loose ends. The advice that follows should help.

Start thinking about selling computers while you're buying them. If you expect to sell the machines and want to recoup as much as possible, buy a name brand. If you're going to use them for something like monitoring fire alarms and don't expect to upgrade, any old clone will probably do.

Avoid depreciation hassles. Use a rapid depreciation schedule, and plan to sell the equipment for more than its book value as soon as you need to upgrade. Re-evaluate the estimated useful life of your computer equipment and its value on a regular basis.

Consider upgrading computers about every two years or every two product cycles. When a manufacturer releases a new model, it depresses the value of the preceding one. When it introduces a second

upgrade — the second obsolescence — it kicks down the first model's value. The most profitable time to sell is when serious rumors of this second technological displacement are going around.

Maintain and track equipment. Try to hold onto the boxes and packing materials for the computers you buy, and keep all the parts for your machines intact. Don't cannibalize. Also, discourage employees from individualizing their computers with stickers and decals. Give them the tools and encouragement they need to keep their machines in good working order.

It is essential to replace broken and lost parts with standard ones. Cheap clone components seriously depress the value of equipment. A bunch of Apple Computer, Inc. Macintoshes with inexpensive, brandless hard drives is like a bunch of Macintoshes with no hard drives at all. People want to buy things they're comfortable with.

It also helps to maintain a database of all computer equipment your organization buys. The records should contain information on things such as configuration, location, serial number, dealer, invoice number, depreciation schedule, residual value and replacement cost.

Choose an outlet. Determine the means of disposal on the basis of the vol-

ume of equipment you're selling. Brokers will deal in small lots. Liquidators will take on somewhat larger ones, but don't expect a great deal.

If you are moving a massive amount of gear — a big department's or a whole company's worth — an auction can be a good way to clear it out. Auctions often fetch top dollar. Bidders can drive the prices to near or even above current retail value. For example, after the demise of Software Arts, Inc., founder Dan Bricklin said he actually sold some equipment at his auction for more than he originally had paid.

If you are replacing older computers with new ones, shop around for a dealer who will take the older machines as trade-ins. Then negotiate for a great deal. If your dealer doesn't take trade-ins, push the issue. If the sale is large enough, the dealer may arrange for a third party to handle the used equipment.

Consider internal options. Companies may also find advantages in disposing of PCs internally. Selling machines to staff members encourages the individuals to take work home, and they might get a tax break on the purchase. Some companies work out generous payroll deduction plans that make it easy for employees to buy PCs.

Large corporations may adopt an internal redeployment plan for moving assets from one location to another. One large company operates a miniature, self-contained secondary market, maintaining an active database of transactions and machines in circulation.

The idea of divisions treating one another as customers is nothing new in corporate accounting, especially in the manufacturing sector. Internal "sales" can save time and energy and ensure that used technology is recycled.

Attend to legal issues. A neat sale ties up all the loose ends and doesn't neglect the interests of software companies or the state. When you sell or donate computers, the issue of software licensing comes into play. Check the publisher's stipulations.

Microsoft Corp., to cite one example, does not restrict you from transferring license rights to someone else for free or for a fee — provided you do not keep copies of the program.

If you do not remove licensed applications from a hard disk before selling a computer, and you continue to use the software after copying it onto a new machine, you're probably breaking the law.

Unless you actually sell the software, destroy all copies of it at your site and the terms of the license agreement are accepted by the buyer, be sure that your hard disks are clean.

Sales taxes for the transfer of used computers is a thorny issue. Taxes vary from state to state. If you make it a practice to trade in the used computer marketplace, you are not making casual sales, which are exempt from a sales tax in most states. In that case, you'd better take care of your legal responsibilities. Check the requirements in your state.

Randall is president and founder of the Boston Computer Exchange and the co-author of *Alex Randall's Used Computer Handbook* from Microsoft Press.



Buy/Sell/Lease

The BoCoEx index on used computers

Closing prices report for the week ending September 7, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	\$475	\$660	\$250
XT Model 086	\$500	\$700	\$350
XT Model 089	\$675	\$825	\$475
AT Model 099	\$1,050	\$1,375	\$850
AT Model 239	\$1,125	\$1,325	\$700
AT Model 339	\$1,250	\$1,400	\$900
PS/2 Model 50Z	\$1,550	\$1,650	\$1,425
PS/2 Model 60	\$1,900	\$2,200	\$1,600
Compaq Portable II	\$975	\$1,150	\$875
Portable II	\$975	\$1,150	\$875
Portable 286	\$1,275	\$1,450	\$1,100
Portable 386	\$3,125	\$3,450	\$2,950
LTE 286	\$2,100	\$2,525	\$2,000
Deskpro 286	\$1,425	\$1,625	\$1,300
Deskpro 386/20	\$2,800	\$3,100	\$2,700
Apple Macintosh 512	\$375	\$775	\$275
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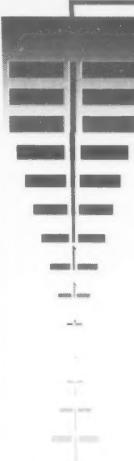
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TRAINING

Getting Help intuitively

Navigating on-line manuals can be easier with hypertext

BY JESSICA KEYES
SPECIAL TO CW

On-line manuals have become popular as an adjunct to classroom training. There are many good reasons for adding on-line instructional methods to the training mix. One is the difficulty of scheduling off-the-job training sessions. Another is the finite capacity of human memory for long-term storage of infrequently used information.

However, the real potential of on-line manuals has barely been scratched. Most are on-line renderings of paper manuals. While paper manuals can be perused with a quick flick of a thumb, on-line translations are usually quite cumbersome to traverse. This is because manuals are sequential in nature.

For example, suppose you want to develop an on-line manual that instructs a user about desktop publishing. The first topic discusses the video screen, naming the different components such as text cursor, art tool kit, text menu, file menu and so on. If the user read this manual all the way through, he would probably have a pretty good understanding of desktop publishing.

WHAT IS NEEDED to make on-line instruction a full-fledged alternative to formal group training is fast and intuitive access.

mation and then scroll until he found the place where he had left off.

Unfortunately, this type of on-line instruction is hardly conducive to effective learning. As such, it can only serve as a supplement to a steady diet of classroom training. What is needed to make on-line instruction a full-fledged alternative to formal group training is fast and intuitive access.

The good news is that the method and means exist to permit the creation of on-line instruction manuals that are easy to

use, fast on retrieval and able to drive directly to the point. The method is hypertext, and the means is a variety of hypertext-based development packages for all hardware platforms.

Hypertext products are readily available in the microcomputer marketplace but are not available as stand-alone packages in a mainframe environment. Mainframe hypertext systems are usually a component of a larger system, generally text-retrieval packages that average in the five-figure price range. On personal computers, though, they're fairly inexpensive — usually priced well under \$1,000. However, they're not all the same, and managers would do well to survey the playing field before making a purchase decision.

Using these tools, it is possible to write applications in such a way that users can teach themselves most or all of what they need to know — working at their own pace and in context.

Going back to the desktop publishing example, someone who uses a hypertext-based training system would be able to rapidly call up explanatory information on handling graphics without having to cross through an endless series of menus and text screens.

When a hypertext training tool is built, selected key words on each screen of text are tagged. These tags, which are words or phrases within the text that are highlighted on the screen, are then linked to additional text that offers the user a fuller

explanation of the tool.

Of course, where there is good news, there usually is some bad news, and hypertext is no exception. The bad news is that hypertext training systems are difficult to develop because they require intimate knowledge of a particular subject in order for a meaningful and complete set of tags to be created.

In addition, from a technical perspective the development of hypertext is usually a multistep process that can be prone to error and failure. This should be kept in mind if the information is volatile and requires constant upkeep. If the text is changed, modifications to the hypertext tags need to be made as well.

The biggest problem by far with hypertext is a lack of integration capabilities. Most hypertext development packages were designed to be stand-alone systems. This poses a real challenge to a developer who wants to integrate one of these off-the-shelf packages into another application.

In spite of any limitations, hypertext remains very much an advanced method of delivering on-line manuals out in the field. Hypertext permits access to information in the same way that people think. Having a hypertext training tool that sits inside of your application brings the teacher out of the classroom and into the office.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.



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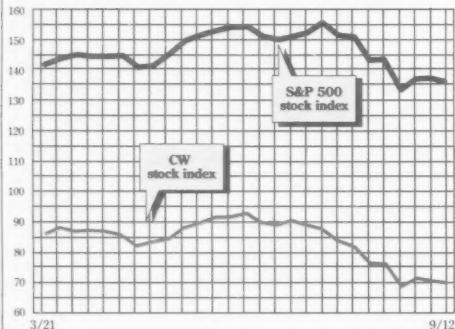
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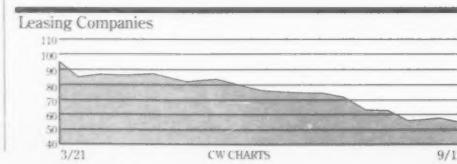
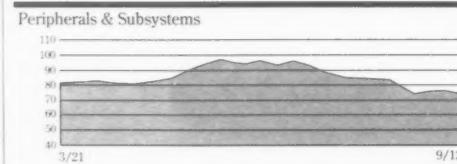
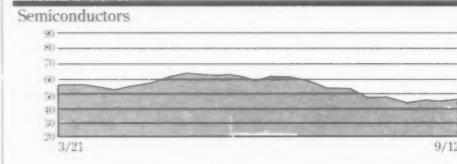
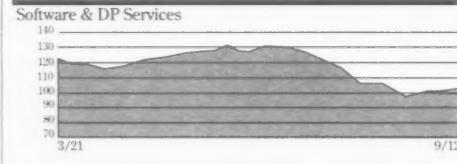
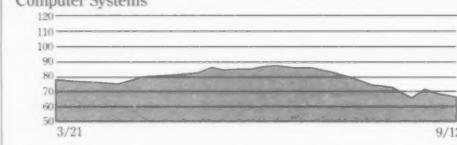
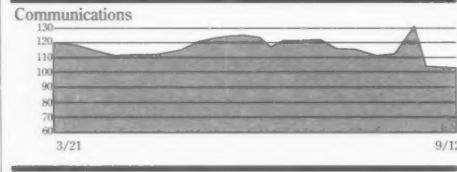
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Peripherals & Subsystems	76.8	75.6
Leasing Companies	59.4	56.8
Composite Index	70.8	70.0
S&P 500 Index	137.1	136.3



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O	ALLOY COMP	2	0	0.43%
O	AM INTL INC	6	1	1.62%
O	AUTO TROL TECH CORP	5	2	3.75%
O	BANCTEC INC	24	13	15.75%
O	DATA FUTURES CORP	8	5	4.75%
O	CONNER PERIPHERALS	31	11	22.25%
O	DATARAM CORP	22	8	12.375%
O	EASTMAN KODAK	50	36	14.5%
O	E.M. CORP/MASS	7	3	5.0%
O	EVANEX CORP	9	4	5.875%
O	EVANS & SUTHERLAND	35	18	25.1%
O	ICOT CORP	2	1	0.875%
O	INTERLOG INC	8	3	3.75%
O	INTERLOGIX CORP	6	3	4.813%
O	MASSTOR/SYS CORP	3	1	0.813%
O	MAJUTOR CORP	17	7	7.375%
O	MICROPOLIS CORP	10	3	5.125%
O	MINNESOTA MFG & MFG CO	91	68	78.625%
O	PERSONAL COMP PRODUCTS INC	5	4	3.75%
O	POWERTRONIX INC	15	9	12.75%
O	RAMS CORP	21	9	12.75%
O	QUANTUM CORP	26	9	17.625%
O	RECOGNITION EQUIP INC	8	4	5.125%
O	REJION INC	10	4	4.688%
O	RETECH TECHNOLOGY	20	8	5.0%
O	STORAGE TECH CORP	35	10	18.875%
O	TANDON CORP	4	1	2.0%
O	TEKTRONIX INC	21	12	14.5%
O	TEVIDEO SYS INC	1	0	0.25%
O	XEROX CORP	67	39	30.125%

Communications and Network Services

N	AMERICAN INFO TECHS CORP	68	53	56.25	1.0	1.8
Q	ANDREW CORP	26	16	18	0.0	0.0
Q	ARTEL COMM CORP	10	3	3	0.0	0.0
Q	AT&T	47	30	30.625	-1.5	-4.1
Q	AVANTEK INC	21	11	10.75	-0.9	-7.5
Q	AYDIN CORP	57	46	43.5	1.4	3.3
Q	BELL ATLANTIC CORP	59	49	50.25	-0.3	-0.5
Q	COMSAT CORP/LABS INC	10	9	13.25	0.9	8.0
Q	COMPUTER NETWORK TECH	0	0	0.01	0.0	0.0
Q	CONTEL CORP	37	23	30.375	-0.5	-1.6
Q	DATA SWITCH CORP	4	2	3.875	0.5	14.8
Q	DATA SYSTEMS INC	18	12	15.75	-0.5	-3.1
Q	DYNAMITE CORP	20	15	16.125	-0.1	-0.6
Q	FIBRONICS INT'L INC	13	5	8.75	0.1	1.4
Q	GANDALF TECHNOLOGIES	6	2	2.875	0.1	4.5
Q	GENERIC DATACOMM INDUS	18	2	2.5	0.1	1.4
Q	GITE COMP INC	38	24	25.25	-0.6	-2.4
Q	INFOTRON SYS CORP	10	2	2.75	-0.1	-4.3
Q	ITTC CORP	64	56	52.375	0.3	0.5
Q	ITV CORP	1	0	0.01	-0.5	-5.9
Q	MCI COMMUNICATIONS CORP	49	31	33.875	0.3	0.7
Q	NETWORK EQUIP TECH INC	34	5	5.5	0.1	2.3
Q	NETWORK SYS CORP	15	7	9	-0.6	-6.5
Q	NOVATEL TELECOM LTD	59	39	23.125	-0.5	-3.6
Q	NOVTEL INC	92	68	69.25	-0.9	-1.2
Q	NYNEX CORP	52	36	41.25	0.9	2.2
Q	PENCO CORP	9	5	6.75	0.1	1.9
Q	RENT-A-CENTER ATLANTA INC	17	10	17.75	-0.7	-3.5
Q	SOUTHWESTERN BELL CORP	65	47	47.625	-0.8	-1.0
Q	3 COM CORP	19	8	8.5	-0.8	-8.1
Q	U.S. WEST INC	41	33	34.875	0.4	1.1

Computer Systems

Q	ALLIANT COMPUTER SYS	9	2	2.75	0.3	10.0
Q	ALPHATEC SYSTEMS	7	2	1.5	-0.3	-14.5
Q	AMDAHL CORP	19	11	12.5	0.1	1.0
Q	APPLE COMPUTER INC	50	32	34	-2.0	-5.6
Q	AST RASH INC	26	8	19	0.5	2.7
Q	BEAUFORT, E&N & NEWMAN	8	4	5.625	-0.3	-4.3
Q	COMPAQ COMPUTER CORP	60	32	44.25	-1.5	-3.5
Q	COMMODORE INT'L	12	5	5.5	0.0	0.0
Q	COMPUTER AUTOMATION INC	6	0	0.5	-0.1	-11.2
Q	CONTROL DATA CORP	22	13	13	1.0	7.1
Q	DATA GENERAL CORP	51	31	35.25	0.5	3.7
Q	DATA GEN CORP	16	5	5.5	-0.5	-8.3
Q	DATAPOINT CORP	6	1	1.25	0.0	0.0
Q	DELL COMPUTER CORP	14	5	11.75	-0.1	-1.1
Q	EMC CORP/NEWPORT	100	61	61.0	-4.9	-7.3
Q	FLOATING POINT SYS INC	0	1	3.75	-0.4	-4.3
Q	HARRIS CORP	40	24	24.75	0.4	1.5
Q	HEWLETT PACKARD CO	52	31	35.125	0.8	2.2
Q	IBM	123	73	94.75	-3.4	-3.4
Q	INFORMATION INT'L INC	15	10	10.5	0.0	0.0
Q	IPSYS INC	14	5	9.25	0.0	0.0
Q	MATRISYS FOUR INC	6	2	2	-0.1	-5.9
Q	MINISUNTA ELEC INT'L LTD	17	11	12.875	3.0	26.0
Q	MENTOR GRAPHICS CORP	26	12	12.5	-1.3	-8.1
Q	NBI INC	2	0	0.188	0.0	0.0
Q	NCR CORP	72	55	60	-1.1	-1.8
Q	NEC COMPUTER TECHNOLOGY	19	13	19.25	-1.0	-5.9
Q	SEQUENT COMPYS INC	34	15	22.25	1.8	12.2
Q	SUN MICROSYSTEM INC	37	15	28.375	-0.8	-2.6
Q	SYMBOLICS INC	2	0	0.438	0.1	39.9
Q	SYNTAC COMPUTER INC	11	11	11.25	-3.1	-21.2
Q	TANDY CORP	48	26	21.75	-2.1	-7.6
Q	ULTIMATE CORP	10	5	5.375	-0.4	-6.5
Q	UNISYS CORP	21	8	8.375	-0.1	-1.5
Q	WANG LABS INC	6	3	3.625	-0.1	-3.3

Software & DP Services

Q	AMERICAN MGMT SYS INC	20	11	13.25	-1.0	-7.0
Q	AMERICAN SOFTWARE INC	18	8	9.375	0.5	5.6
Q	ANACOMP INC	6	2	2.375	0.0	0.0
Q	ANALYSTS INT'L CORP	24	14	17.5	0.0	0.0
Q	ASHTON TATE	15	7	7.875	0.1	1.6
Q	AT&T COMPUTER SYS INC	60	44	49.375	-1.3	-2.6
Q	AUTODESK INC	60	33	46.5	-2.8	-5.6
Q	BMF SOFTWARE INC	14	2	2.875	-0.1	-10.0
Q	BROADCOM CORP	7	2	2.25	-0.3	-2.2
Q	COGNOS INC	10	4	7.525	0.9	13.0
Q	COMPUTER ASSOC INT'L CORP	18	6	6.625	-0.8	-10.2
Q	COMPUTER HORIZONS CORP	20	17	15.5	1.8	12.7
Q	COMPUTER SCIENCES CORP	20	17	17.75	-0.5	-2.8
Q	COMPUTER TASK GROUP INC	12	9	9.125	0.1	1.4
Q	COMSHARE CORP	25	16	18	-0.3	-1.4
Q	CORPORATE SOFTWARE	16	8	12	0.5	4.3
Q	GENERAL MTRS (CMLS E)	38	24	33.25	2.0	6.4
Q	GENRAD INC	10	11	11.5	-0.2	-1.2
Q	HOGAN SYS INC	7	2	3.25	0.1	4.0
Q	INFORMIX CORP	18	6	7	0.3	3.7
Q	INTELLICORP INC	8	4	4.375	0.3	5.4
Q	LEGIS CORP	43	30	20.75	-1.0	-4.7
Q	LOTUS DEV CORP	39	15	17	-0.1	-6.8
Q	MICROSOFT CORP	81	50	57.375	-1.6	-2.6
Q	NATIONAL DATA CORP	35	8	10.5	0.5	5.0
Q	NETSCAPE COMPUTER INT'L INC	1	0	0.5	0.0	0.0
Q	ORACLE SYS CORP	188	77	8.25	2.4	22.4
Q	PANASONIC SYS INC	19	10	11.375	0.1	1.1
Q	PHOENIX TECHNOLOGIES INC	5	2	3	0.0	0.0
Q	PROGRAMMING & SYS INC	43	30	37.25	-4.0	-10.0
Q	RELATIONAL TECH INC	24	14	9	4.5	100.0
Q	REYNOLDS & REYNOLDS CO	27	15	14.875	-0.4	-2.5
Q	SCSI CORP/INTERFAC INC	16	8	10.375	-0.3	-2.4
Q	SHARE MED SYS CORP	17	12	14.875	-1.0	-6.8
Q	SOFTWARE PUBLS CORP	28	14	24	0.3	1.1
Q	STERLING SOFTWARE INC	11	7	7.125	-0.3	-3.4
Q	SUPERIOR COMPUTER SYS INC	20	16	11.75	-0.6	-6.6
Q	SYSTEM CENTER INC	25	9	8.875	-0.6	-6.6
Q	SYN. SOFT INC	29	16	20.75	-1.3	-5.7
Q	WORDSTAR	2	1	0.75	0.1	9.0
A	WESTERN DIGITAL CORP	15	6	8.625	-0.6	-6.8

Semiconductors

N	ADV MICRO DEVICES INC	11	5	5.875	0.0	0.0
N	ANALOGIC CORP	10	6	6.375	-0.1	-1.9
N	CHIPS & TECHNOLOGIES INC	26	10	11.375	-0.1	-1.1
Q	INTEL CORP	52	30	32.75	0.3	0.8
Q	MICROLOGIC TECHNOLOGY INC	16	7	9	0.4	4.3
Q	NEUTRONIC LINC	9	4	6.0	-0.3	-11.9
Q	NATL SEMICONDUCTOR	25	16	20.75	-0.3	-11.9
N	TEXAS INSTRS INC	44	25	28.5	1.1	4.1
A	WESTERN DIGITAL CORP	15	6	8.625	-0.6	-6.8

Peripherals

O	ALLOY COMP	2	0	0.438	-0.3	0.0
O	AM INTL INC	6	1	1.625	0.0	0.0
O	AUTO TROL TECH CORP	5	2	2.375	0.1	12.5
O	BANCTEC INC	24	13	15.75	0.5	3.3
O	DATA FUTURES CORP	8	3	4.5	0.4	0.0
O	GANAR	31	11	22.25	0.0	0.0
O	EASTMAN KODAK	50	36	41.5	0.0	0.0
O	EVANEX CORP	35	18	25.125	0.1	2.1
O	INTERLOG INC	2	1	0.875	-0.1	-1.4
O	INTERLOG					

NEWS SHORTS

Split decision on IBM

IBM recently won a sweeping victory on the copyright portion of the series of copyright and antitrust claims, counterclaims and defenses that have been going on between IBM and computer reconfigurer Allen-Myland, Inc. (AMI) since 1985. Predictably, AMI filed an appeal within days. However, the Philadelphia federal judge also found that IBM's price-setting on 3090 microcode virtually prohibited splits — the practice, used by AMI and others, of reconfiguring one large processor as two smaller ones — and, in so controlling a third party's activities, violated the 1956 Antitrust Consent Decree. IBM is also contemplating an appeal, an IBM spokesman said.

Timeplex goes with the flow

Revving up to meet the shifting, data-intensive needs of the T1 market, Timeplex, Inc. last week announced its intent to face off with its competitors by supporting frame-relay technology. Frame-relay is an Integrated Services Digital Network (ISDN)-based standard protocol that offers a high-speed interface to wide-area networks to ensure optimal use of network bandwidth and low network delay. The company is gaining the frame-relay expertise through the acquisition of Irvine, Calif.-based Doeil, Inc. Timeplex also announced a T1-to-ISDN Primary Rate Interface gateway, which will allow private T1 network users to interface with public ISDNs.

Computergate hits New Jersey

An electronic version of Watergate is playing out, shaking up the New Jersey political community. One of the state's top Republicans resigned on Sept. 7 after admitting he knew that Democrats' computer files were breached. John Kohler, executive director of the Republican General Assembly staff, resigned after revealing that, contrary to his previous statements, he knew about "improper access to Democrat staff computer records," according to a statement released by the assembly GOP office. An assembly staff member who is alleged to have actually done the break-ins was fired earlier this year, according to published reports. The Attorney General's office and an assembly ethics committee are investigating.

Pacific Bell promotes Hancock

Jack Hancock, Pacific Bell's vice-president of information systems, has a new slice of the \$9.6 billion organization that was restructured recently. Hancock, 60, is now executive vice-president of Pacific Bell's Product and Technology Support group, one of three corporate executives reporting to Philip Quigley, Pacific Bell's chief executive officer. "The job is expanded," Hancock said. "So I'll spend less time dealing with information systems and internal communications." Hancock's new focus will be the integration of the company's IS infrastructure with Pacific Bell's development of telephone and communications services, including call-waiting and Centrex.

Toshiba disk plans sting Conner

Toshiba Corp. last week announced its plans to manufacture its own 2½-in. hard disk drive for personal laptop and notebook-size computers. The news, when heard on Wall Street, sent stocks falling at Conner Peripherals, Inc. — a leading disk drive manufacturer — down \$1.625 last Thursday to \$20.625 per share. However, James Porter, president of Mountain View, Calif.-based DiskTrend, Inc., said the reaction was overblown. Toshiba, which accounts for about 5% of Conner Peripherals' sales, should not harm Conner in the long run, Porter said.

SS7 to flourish in 91?

AT&T said last week it will deploy Signaling System 7 (SS7) throughout its long-distance network by early 1991. SS7, an out-of-band signaling scheme for the public network that enables faster setup of calls through the network, is regarded as a necessary precursor to the ISDN; SS7 itself provides a number of valuable end-user services, including automatic number identification.

OS/2 network tie-ins get third-party boost

BY JIM NASH
CW STAFF

DALLAS — Fresh from a nationwide road trip organized to raise the profile of LAN Manager Version 2.0, Microsoft Corp. executives converged on Network '90 last week to beat the OS/2 drum and announce a handful of networking product tie-ins.

Microsoft Chief Executive Officer Bill Gates was on hand as Software Publishing Corp. (SPC) introduced Infoalliance, an executive information system-like package that runs exclusively on OS/2. Gates said his company had been working with SPC on the product for two years.

Microsoft officials said the announcement heralded proof that OS/2 is coming into its own. Gates predicted that Infoalliance would be the first of many soft-

ware products that will require OS/2, which has suffered from lackluster sales.

Later, Mike Murray, Microsoft's general manager of networking products, announced Version 2.5 of a similar application called Q+E. The software is made by Pioneer Software and is DOS-based.

"It took OS/2 to build Infoalliance," said Fred Gibbons, president and CEO of SPC. The product retrieves text, graphics and spreadsheets from IBM OS/2 Extended Edition's Database Manager, Ashton-Tate Corp.'s DBase III Plus and DBase IV for reports and other decision-assistance tasks. The base package costs \$2,995.

Acknowledging OS/2's slow growth, Gibbons said SPC intends to work Infoalliance into the market slowly. The compa-

ny, has, for example, chosen only three resellers. "We don't want to overpromise," Gibbons said.

Coca-Cola Co. in Atlanta performed beta testing on Infoalliance. Tim Byers, project manager for Coca-Cola's DOS, OS/2 and Windows development, was on hand at the announcement and said his department developed Keystone, a retail survey application, using the software.

Byers said the end-user orientation cut down on the number of programmers directly involved in bringing up Keystone, but he added that he would like to see an Apple Computer, Inc. Macintosh version. He said Coca-Cola is running 200 copies of Infoalliance on Extended Edition with Microsoft's Presentation Manager front ends.

Q+E is a database query and edit tool. With it, users can connect Windows applications such as Excel with external databases. The new version is compatible with Microsoft's Windows Version 3.0 and costs \$149.

Plastic fiber showcased for LANs

BY JOANIE M. WEXLER
CW STAFF

DALLAS — In the latest bout of creative cable-swapping in the local-area network arena, Codenoll Technology Corp. and General Motors Corp. proclaimed last week at Network '90 that plastic fiber technology will drop-kick twisted-pair wire and coaxial cable out of walls, floors and elevator shafts forever.

The two companies announced that a six-year joint venture has culminated in a technology that will allow companies to run plastic fiber cabling to desktops less expensively than when using twisted-pair, coaxial or existing glass fiber cabling. At the show, Codenoll demonstrated a plastic fiber Ethernet local-area network and advocated the technology for use in other LANs, such as 100M bit/sec. Fiber Distributed Data Networks (FDDI).

GM is in on the act because plastic fiber has long been used in the automotive industry for connecting the microprocessors that control the radio, steering, engine, transmission, suspension and other operations in a car.

Codenoll President Mike Coden cited a maximum 100-meter distance between nodes for plastic fiber compared with the 2-km internodal distances specified in the FDDI standard, which is based on glass. Coden said that plastic fiber has the ability to send data at 300M to 400M bit/sec. speeds, although the FDDI standard specifies 100M bit/sec. and some industry observers actually cite some data rate limitations using the plastic medium.

"In our development activity, we've been pushing the speed of plastic fiber to higher and higher data rates until it came into the appropriate realm for LANs," said Bob Steele, staff development engineer at GM. "Now we're looking to swap out the twisted-pair portion of our network for plastic fiber because of the simplicity of termination and its low cost compared with data-grade twisted pair."

Coden offered the following

approximate prices per foot for the various data transmission media: plastic fiber, 10 to 15 cents; unshielded twisted pair, 14 cents; coaxial cable, 14 cents; glass fiber, 28 to 40 cents; shielded twisted pair, 62 cents.

Other key advantages of plastic fiber reportedly include its immunity to electromagnetic interference, unlike its copper counterparts; its ease of installation; and durability in comparison with glass fiber.

Cabletron goes token-ring

DALLAS — Cabletron Systems, Inc. showed those attending Network '90 last week its new line of 4M and 16M bit/sec. token-ring network management products. The announcements marked Cabletron's expansion beyond its traditional role as an Ethernet goods supplier.

The Rochester, N.H., firm introduced network interface cards for IBM Personal Computers, including Micro Channel Architecture-based devices, and for Apple Computer, Inc.'s Macintosh II. Also unveiled were management applications offering local and remote management down to the port level.

According to the company, the products will run on shielded and unshielded twisted-pair and fiber-optic cables.

Competitor Synoptics Communications, Inc. in Mountain View, Calif., announced a low-end DOS-based network management application to isolate and troubleshoot problems. Called Lattisnet Basic Ethernet

Network Management, the product is aimed at smaller networks.

Other announcements rolled out at Network '90 included the following:

- A joint announcement from the CCITT X.400 Application Program Interface Association and X/Open Ltd. of Version 2 of the specification for their messaging-gateway application programming interface (API). The groups also announced a messaging API standard enabling X.400 messaging capabilities such as submission, delivery and retrieval to be written directly into word processing, spreadsheets and other nonmessaging applications.

- Ungermann-Bass, Inc.'s network protocol stack based on Microsoft Corp.'s Network Driver Interface Specification (NDIS). The Santa Clara, Calif., firm's product, called TCP/IP for NDIS, allows for greater third-party adapter throughput.

JIM NASH

Upgrading ES/9000 by the rules of the game

BY ROSEMARY HAMILTON
CW STAFF

There are several official rules to the Enterprise System/9000 upgrade game.

It also appears that IBM will be willing to offer some decent deals to users.

While the company announced price increases for upgrades within the 3090 family on Sept. 5, a number of price breaks that have been in place will be continued until the end of the month.

"We expect to ship large numbers of upgrades to Js," said Bernard Puckett, president of IBM's Data Systems Division, in an interview earlier this month. "We'll be offering a price break on base, E and S-to-J upgrades."

Two of the early ES/9000 users indicated that IBM negotiated good deals for the purchases, although they would not provide any details.

Aside from the unofficial bargaining that may take place, the following are the official ES/9000 upgrade rules as provided by Thomas Waldron, IBM large systems product marketing manager:

First, users must upgrade to the ES/9000 from a full-function

J platform. That means a Model 180 or above.

Users on base, E or S models need to get to a J if they want to field upgrade to a ES/9000 in the future.

A move from a J model to an ES/9000 can be accomplished as a field upgrade for the first several water-cooled ES/9000 models. Users are required to take a step up when they do this.

The one exception to this rule is the horizontal upgrade provided for 600J users to the Model 720.

At the moment, they have no way to increase capacity, so this is an accommodation to get them onto the new platform.

Moves to ES/9000 Models 820 and 900 require a complete swapout, because they will contain brand-new engines.

The systems are scheduled for shipment in late 1991.

Currently, IBM will provide financial incentives to certain high-end 3090 users that will allow them to credit the value of their current system toward the purchase of a ES/9000 Model 900.

However, users cannot use the credit in upgrading to a Model 820. Waldron provided no specific reason why.

Upgrades

FROM PAGE 1

3090 600J engine in a new package, is considered a pointless move by some high-end customers because it basically provides only new packaging. Yet several other companies recently installed that very system.

For Manufacturers Hanover Trust, the Model 720 is a stop along the way.

The company plans to eventually run two ES/9000 Model 900s as part of a consolidation plan to replace several 3090 E and base models, said Michael Szteinberg, vice-president of technical services. However, the company did not want to wait for the Model 900s, which are scheduled for availability in the third quarter of next year.

So the company opted for a two-step upgrade to the Model 900. Szteinberg said his company made a deal with IBM that called for the installation of two ES/9000 Model 720s, which will then be upgraded to Model 900s when they become available. The Model 900s are based on new engines but will have the same frame as the Model 720s. The move calls for a complete swapout on the first round with the Model 720s and then a lesser upgrade to the Model 900s.

The first Model 720 was installed earlier this month, and the second one is scheduled for delivery in October.

Blue Cross/Blue Shield of Western Pennsylvania installed a Model 720 in order to get a needed performance boost and get on the new mainframe platform, said Charles Southworth, chief technical officer.

The system replaced two 3090 300Es that were coming off lease.

"The 720 gives us at least the 600J performance and then it sets us up for a move to the next level," Southworth said.

Other users expect a more gradual move to the new platform.

George Perera, a group director of information systems at Ryder Truck Rental, Inc. in Miami, is currently sketching out a multi-year plan.

The company now runs a 3090 400 E and will likely move to a Model 500 J. The next step would be an ES/9000 Model 720, Perera said.

At that point, Ryder would be on the new platform and could add capacity by an engine swap later on.

"These are not final decisions but are very likely possibilities," Perera said. "For the next three years, there's going to be a box there if I need it."

ES/9000's muscle caught their eye

More bang for the buck and the availability of fiber-optic cabling between CPUs and peripherals were the two items that most often caught the eyes of potential buyers when IBM released its wave of products two weeks ago.

In a *Computerworld* telephone survey of 100 IBM 3090 users conducted last week, 40 of them said they are planning to acquire an Enterprise System/9000. Nearly half of those users said they expect to make the switch within the next year.

Twenty-five of the 40 users who plan to upgrade expect to

replace an existing 3090. IBM has taken unprecedented steps to smooth the upgrade path to the new mainframes.

Although IBM's Sept. 5 announcement featured a flood of operating system and networking enhancements, it is still raw muscle that caught users' fancy. Asked what factors are most important in their decision to acquire an ES/9000, most users cited better price/performance, speed and capacity.

Another hit is the Escon architecture, which allows CPUs and direct-access storage de-

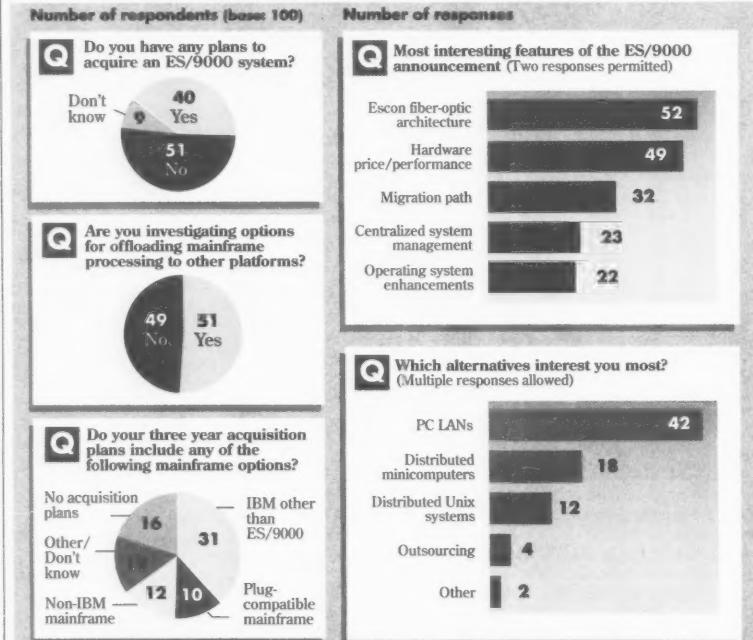
vices to be placed up to 5.6 miles apart. More than half the respondents said Escon was one of the two most interesting aspects of the announcement.

The survey was conducted between Tuesday and Thursday last week. Respondents included members of *Computerworld*'s Editorial Advisory Board and 3090 users whose names were provided by Installed Technology International, Inc. About half the sites have more than 50 million instructions per second of mainframe power.

MAURA J. HARRINGTON

Tough customers

There's no overwhelming rush to the ES/9000, and buyers are examining other options such as downsizing or using existing equipment



Source: Computerworld Survey of 100 IBM 3090 users

CW Chart: Paul Mock

Epson leaps onto 80386SX notebook bandwagon first

BY MICHAEL FITZGERALD
CW STAFF

Epson America, Inc. last week became the first company in the U.S. to announce a notebook computer based on the Intel Corp. 80386SX chip. Analysts said they expect most of the major portable computer makers to release similar machines before the end of the year.

Earlier 386SX-based portables have been laptop machines weighing in at more than 10 pounds.

With delivery scheduled for later this year, the Epson NB3 computer will weigh 5.8 pounds

and offer 1M byte of random-access memory, a removable 20M- or 40M-byte hard drive, black-on-white IBM Video Graphics Array graphics and a 3½-in. floppy disk.

In addition, Epson will offer a docking station — a frame that recharges the NB3 and includes added capabilities — that features an up to 120M-byte hard drive and two slots for standard AT cards. The docking station and the notebook machine together weigh 9½ pounds. Epson said pricing information will be available in four to eight weeks. However, analysts predicted that the machines will retail from

\$4,000 to \$5,000.

Among other makers, Compaq is widely rumored to be releasing a below seven-pound, 386SX-based version of its popular LTE line of notebook computers, although the company refused to comment. Bruce Stephen, an industry analyst at International Data Corp. in Framingham, Mass., said he expected Comdex/Fall would be "SX notebook city," with major announcements and product exhibitions from most portable makers.

"There's going to be a whole slew of these by the end of the year," agreed Andrew Seybold, an industry analyst at Dataquest, Inc. in San Jose, Calif. Seybold said that these machines were aimed at the desktop market. "It's not going to do well as a second machine."

There's no rush to MVS upgrade

Although they applaud MVS/ESA Release 4.0, few users are ready to buy

BY JOHANNA AMBROSIO
CW STAFF

Some IBM MVS users are just saying "no," or at least "not now," to the new release of the operating system that IBM announced with its Enterprise System/9000 mainframes earlier this month.

Users said there appears to be nothing wrong with MVS/ESA Release 4.0; indeed, many lauded its new systems management and other features. However, most said they are not ready to upgrade and probably will not do so for at least a year.

Large users said that because the top-end ES/9000s that take full advantage of the new MVS version will not be available for a

year, there is no rush. Small and medium-size users have other reasons — finances, other priorities and their own corporate strategies among them — that bar an immediate switch.

Kathleen Rowe, manager of software support for Trans Union in Chicago, said that MVS 4.0's dynamic reconfiguration features are "a big deal to us because it means fewer interruptions, more flexibility and less funny hours for our support people." She also said that the ability to run Advanced Program-to-Program Communications from within MVS is a good feature.

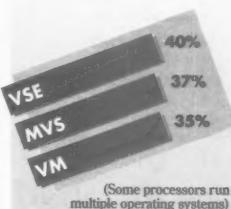
"People have been asking for this for a long time," Rowe said.

Still, because her company is building a new data center and is

bringing in new hardware, "I'm not positive whether we'll be upgrading to the new version; at least, not this year," Rowe said. She added, however, that Trans Union's general policy is to be not more than one year behind new announcements.

First Alabama Bancshares in Montgomery is just now upgrading to Version 3.0 of MVS/ESA. "The new release just doesn't provide anything we need right now," said Delmar Epton, executive vice-president of the operations department. "The ideas of hyperbatch and expanded storage excite us, but they're a couple of years away." His company opted not to go with the 3090J and is instead choosing the 3090E. "In two years, we'll

Respectable following
MVS is second only to VSE on IBM 4381 and larger systems



Source: International Data Corp.

CW Chart: Chuck Fleicher

go directly to the new hardware and the new software and skip the completely," Epton said.

Tom Loane, vice-president of computers and communications services at Alamo Rent a Car, Inc. in Fort Lauderdale, Fla., said, "I haven't seen a reason

why I would want to upgrade right now. We're on MVS/ESA 3.1, and it's damn good — one of IBM's better products. There's no rush to get to 4.0, and there's an unwritten rule that says that any release number that ends in zero is suspect anyway."

Other, smaller shops noted that because they are still running MVS/IXA, upgrading to any version of ESA is too much of a strain. "Going over to ESA would entail a hardware upgrade, and we're just not ready for that," said Kenneth Scharf, vice-president of MIS at Fisher Camuto, a Stamford, Conn., wholesaler of women's shoes.

"The retail market is very soft right now, so we're operating behind the leading edge of technology," Scharf said. "The idea is to take advantage of the lower equipment prices on the used market and stay a few steps behind the latest products to reduce our operating costs."

VM, VSE users upbeat on potential

BY JOHANNA AMBROSIO
CW STAFF

IBM's VM and VSE users say new versions of the operating systems introduced earlier this month symbolize IBM's commitment to products that have long been outside the mainstream.

The only question for VM users is how much conversion will be required to move over to VM/ESA from the three existing VM versions. "The scope of the conversion will depend on which VM version you currently run," said Cyrus Mead, group VM manager at Guide International in Chicago.

"If you're running VM/XA, it will probably be rather minimal," Mead said. "We expect more effort will be required for people running VM/SP HPO and VM/SP, particularly for those still on Release 5.0, which is the majority of the user base is." Nevertheless, he added, "we don't expect any really horrendous problems."

Despite glitches that may arise, Mead said, the response of most VM users has been "quite favorable" toward the new VM system. "Everyone's wasted a tremendous amount of time and

effort trying to keep things current among all three systems."

Other advantages of VM/ESA are improved workstation support and IBM's promise that it will assume all responsibility for the integrity of VM/ESA.

Other VM users were a bit less enthusiastic. "I'm intrigued with ESA, but it's a real bear to get there from where we are," said Hugh O'Connor, director of management information services at the Jockey Club, a thoroughbred registry organization in Lexington, Ky., which is currently using VM/HPO. "We might bypass XA and go directly to ESA, but I hear that conversion is very significant."

For their part, VSE users are celebrating Release 1.0 of VSE/ESA. "Isn't it wonderful?" said Pete Clark, a systems programmer at Olan Mills, Inc. in Chattanooga, Tenn. "I'm tickled to death. VSE users have been waiting for a long time for a lot of this; it's the most significant announcement in VSE history. To see VSE turn 180 degrees from nonstrategic to strategic is pretty significant."

Clark said he is very excited about many of the features, such as more real memory support,

added partitions and new direct-access storage device support.

Equally as exciting, he said, are IBM's statements of direction to add to VSE 2G-byte address space and data spaces, which allow data to be written to memory instead of tape or disk.

Even VSE users with no immediate plans to move to ESA say the new version seems to be on track. "It's smart on IBM's part to recognize that the VSE base is not biting the bullet to upgrade to MVS," said Ken Dallwig, corporate director of information systems at Crown Central Petroleum Corp. in Baltimore. "I feel good that it's a strategic product now."

Still, he will not be going over to the new release soon. "We've hit some limitations in VSE, but we've learned to live with them. We just can't justify going over to the new hardware to take full advantage of the new software."

Those sentiments were echoed by Judie Smith, manager of technical support at Bangor Hydro-Electric Co. in Bangor, Maine. "I don't see ESA in our near future, although ESA's virtual partitions may be meaningful to us at some point," she said.

CA expands DBMS families with SQL, DB2 transparency

BY JOHANNA AMBROSIO
CW STAFF

WASHINGTON, D.C. — Computer Associates International, Inc. folded SQL into its database product mix last week with new versions of Datacom and IDMS that conform fully to the ANSI Structured Query Language (SQL) standard.

Datacom and IDMS now also sport IBM DB2 "transparency," which means that CA users can purchase and run DB2 applications without having to change code or buy DB2. This is the first time that SQL and any DB2 compatibility have been included in IDMS and Datacom.

Further, CA said it will release versions of both its database management systems for Unix and for Digital Equipment Corp. VAXes. Users said they are excited about the SQL compatibility.

"SQL is critical because it's an industry standard," said Robert Cancilla, technical services manager at Fremont Compensation Insurance Co. in Los Angeles and a beta-test user for Datacom 8.0. "And CA's implementation is even better than IBM's." CA claimed its SQL runs three times faster than IBM's version.

George Emmanuel, manager of manufacturing and database systems consulting services at Hughes Aircraft Co. in Long Beach, Calif., has not actually seen the new IDMS release.

Still, he said, he is looking forward to the SQL functions. "I have 7,000 users who want access to the corporate database. SQL allows me to make all that

available to them."

"We can now add value to our existing system, IDMS, instead of having to bring in another DBMS," he added.

CA's implementation of SQL is about 99% compatible with IBM's version, according to Dominique LaBorde, CA vice-president of research and development. "The goal is 100%, and we'll achieve that in our next release," he said.

Release 8.0 of Datacom and Release 12.0 of IDMS do several things for users, he said: "You can integrate relational and navigational databases, and you can run DB2 applications against IDMS and Datacom without making any changes to the databases." In other words, users can employ Datacom, a navigational database, for its speed and still have access to relational data through SQL.

Further, LaBorde said, "Our DBMSs run across mainframes and personal computers — unlike IBM, which has different database managers for each platform. And ours are not just ports; they're engineered for each specific environment."

CA announced MS-DOS versions of its mainframe DBMSs in July. When all the PC pieces become available during the next year or so, fully distributed applications will be possible between the mainframe and PC versions, LaBorde said. This will include full two-phase commit, he said.

CA is already working on the next release of Datacom, Version 8.1, which is scheduled for availability in mid-1991. It will include additional performance and security features.

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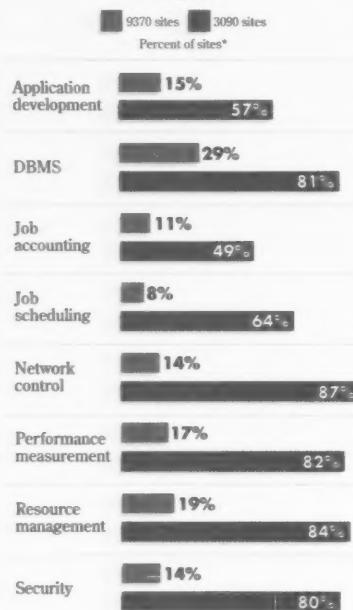
TRENDS

Software Implementation: The IBM 9370 vs. the 3090

While 3090 systems are better equipped to handle a broad range of software, the 9370 still plays a supporting role. Contrasting software use implies a need for central processing support from larger systems rather than software incompatibility

System software penetration

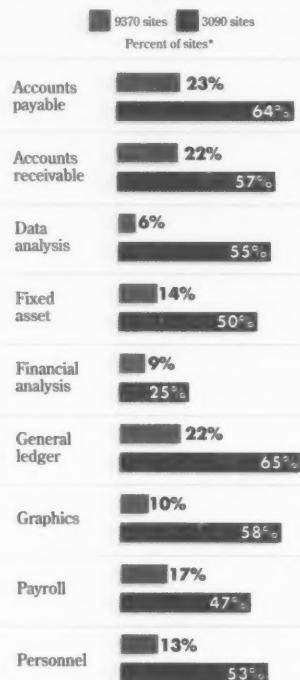
High use of system software on the 3090s is especially evident in areas dealing with system management



*Based on a survey of 11,000 sites per month
Source: Computer Intelligence, La Jolla, Calif.
CW Chart: Tom Monahan

Application software penetration

Mirroring system software, application levels at 3090 sites are three to four times higher than at 9370 sites



The most far-reaching change in information system management in the next decade may be the overlap of careers in IS and general business. One individual with a particularly clear perspective on that issue is F. Warren McFarlan, a professor at Harvard Business School. Learn McFarlan's views in a Manager's Journal interview.



Stephen Lewis

Consortiums cannot work in America . . . or can they? After seven years, Microelectronics and Computer Technology Corp. (MCC) has finally started to pay dividends for its members. What is happening down in Austin, Texas, and what has MCC done to turn things around? See In Depth for a closer look at this consortium.

INSIDE LINES

Everybody's doing the mainframe

Now that IBM, Fujitsu and Hitachi Data Systems have had their turns, Amdahl is ready to announce a mainframe this week. Industry analysts said they expect that tomorrow's introduction will exceed 50 million instructions per second in raw processing power. Most analysts expect Amdahl to match or exceed IBM's Enterprise System/9000 announcement by promising fiber-optic channels, support for new MVS/ESA capabilities and intentions to match IBM functionality now hidden in proprietary IBM microcode.

Steal this modem

Leemah Datacom Security Corp. recently wrapped up its second annual challenge to hackers, who were given the chance to retrieve a secret message stored in two PCs protected with a Leemah callback modem. While hackers failed to break in, the challenge was not as big a success as officials predicted. Even though the company added a second PC and challenge site to accommodate what they thought would be a mass hacker attack, only 2,009 hackers tried and failed to hack into the PCs compared with nearly 8,000 failed attempts last year. Apparently, many hackers feared that the company was cooperating with the government in a sting operation.

But can it pick up MTV?

Xerox Corp. is being incredibly secretive about its new do-all product, code-named (of all things) Zenith. Various reports say it's sort of a hybrid photocopier/computer, but some sources say it could revolutionize the high-end printer market. Zenith definitely has Postscript capabilities and can be networked. It is also supposed to offer state-of-the-art imaging capabilities, "paperless" copying and facsimile capabilities, for starters. All Xerox will say is that it will be releasing products that incorporate digital technology before the end of the year. Look for the answers on October 2, insiders say.

Put your trust in government

The head count at the National Security Agency's computer security center is down to 12 people, from 300 earlier this year, according to a source. "They have either been reassigned or just gone," the source said. The computer security responsibility is being "dumped" on the National Institute of Standards and Technology, our source added. Meanwhile, over at NIST, the computer security head count is at 12, down from 30 as a result of budget cutbacks.

OSI feeling blue

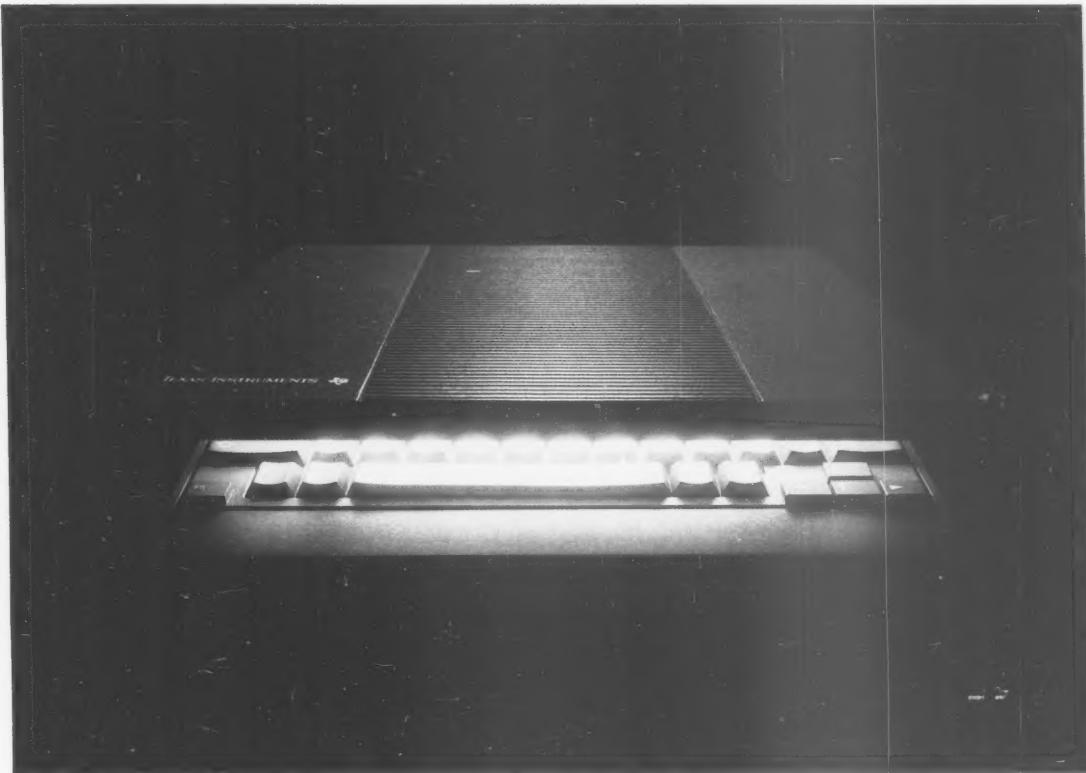
As if DEC needs more problems, IBM is expected to fill the gaps in its Open Systems Interconnect suite this week. Among the announcements expected are OSI support for IBM's OS/400 and OS/2 families as well as for Officevision; X.400 for the Risc System/6000; and a new version of the OSI Communications Subsystem for IBM mainframes, which will have Government OSI Profile compliance and X.400 support. Meanwhile, DEC still doesn't have OSI support out the door in Decnet Phase V.

Modesty in motion

Cabletron Systems is gearing up for a Tuesday announcement of what it deems the most comprehensive enterprise network management system in the history of the universe. The company revealed that the new system revolves around artificial intelligence-based software, is Unix-based and protocol-independent. It sports a graphical user interface and will manage everything from a computer network to a telephone system to a manufacturing floor to an air-conditioning unit.

A reseller who begged not to be identified said unusually harsh incentives were employed by Microsoft in getting its LAN Manager 2.0 out the door. The reseller reports that posters appeared here and there suggesting "Ship or Die." "It's always been 'Publish or Perish' around here, especially when the newswires are buzzing like they've been lately. Ship your own news tips over to News Editor Pete Bartolik via telephone at (800) 343-6474, fax at (508) 875-8931 or on MCI-mail address COMPUTERWORLD.

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